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WATER QUALITY OF INTERSTATE STREAMS IN THE SUSQUEHANNA RIVER BASIN MONITORING REPORT #4 WATER YEAR 1990 (OCTOBER 1, 1989 – SEPTEMBER 30, 1990)

SUSQUEHANNA RIVER BASIN COMMISSION

OCTOBER 1991

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The Susquehanna River Basin Commission was created as an independent agency by a Federal-Interstate Compact* among the States of Maryland, New York, Commonwealth of Pennsylvania and the Federal Government. In creating the Commission, the Congress and State Legislatures formally recognized the water resources of the Susquehanna River basin as a regional asset vested with local, State and National interests for which all the parties share responsibility. As the single Federal-Interstate water resources agency with basinwide authority, the Commission's goal is to effect coordinated planning, conservation, management, utilization, development and control of basin water resources among the government and private sectors.

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* Statutory Citations: Federal - Pub. L. 91-575, 84 Stat. 1509 (December, 1970); Maryland - Natural Resources Sec. 8-301 (Michie 1974); New York - ECL Sec. 21-1301 (McKinney 1973); and Pennsylvania - 32 P.S. 820.1 (Supp. 1976).

WATER QUALITY OF INTERSTATE STREAMS IN THE SUSQUEHANNA RIVER BASIN

MONITORING REPORT #4

WATER YEAR 1990
(October 1, 1989 - September 30, 1990)

Prepared By:

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Environmental Specialist

Resources Quality Management & Protection Division

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Water quality of interstate
streams in the Susquehanna
Monitoring report #4

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CONTENTS

	Page
ABSTRACT	1
INTRODUCTION	2
BASIN GEOGRAPHY	2
METHODS	4
Sampling frequency	4
Stream discharge	15
Water samples	15
Field chemistry	17
Macroinvertebrate sampling	17
Data synthesis	18
RESULTS	19
New York/Pennsylvania border streams	19
Pennsylvania/Maryland border streams	22
REFERENCES	57

APPENDIXES

Appendix A.--DATA FOR GROUP 1 STATIONS	59
Susquehanna River at Windsor, N.Y.	61
Susquehanna River at Kirkwood, N.Y.	64
Cayuta Creek at Waverly, N.Y.	67
Troups Creek at Austinburg, Pa.	69
Cowanesque River at Lawrenceville, Pa.	71
Tioga River at Lindley, N.Y.	73
Chemung River at Chemung, N.Y.	75
Susquehanna River at Sayre, Pa.	78
Susquehanna River at Marietta, Pa.	80
Scott Creek at Delta, Pa.	82
Conowingo Creek at Pleasant Grove, Pa.	84
Octoraro Creek at Rising Sun, Md.	86
Ebaugh Creek at Stewartstown, Pa.	88
Deer Creek at Gorsuch Mills, Md.	90
Susquehanna River at Conowingo, Md.	93
APPENDIX B.--DATA FOR GROUP 2 STATIONS	95
Cascade Creek at Lanesboro, Pa.	97
Trowbridge Creek at Great Bend, Pa.	99
Snake Creek at Brookdale, Pa.	101
Little Snake Creek at Brackney, Pa.	104
Choconut Creek at Vestal Center, N.Y.	106

Page

Apalachin Creek at Little Meadows, Pa. 108
Wappasening Creek at Nichols, N.Y. 110
North Fork Cowanesque River at North Fork, Pa. 112
Holden Creek at Woodhull, N.Y. 114
Seeley Creek at Seeley Creek, N.Y. 116
South Creek at Fassett, Pa. 119
Bentley Creek at Wellsburg, N.Y. 121
South Branch Conewago Creek at Bandanna, Pa. 123
Long Arm Creek at Bandanna, Pa. 125
Big Branch Deer Creek at Fawn Grove, Pa. 127
Falling Branch Deer Creek at Fawn Grove, Pa. 129

ILLUSTRATIONS

Page

Figure 1. Map showing Susquehanna River basin 3

2. Interstate streams along the New York/Pennsylvania border between Cascade Creek and Apalachin Creek 11

3. Interstate streams along the New York/Pennsylvania border between Seeley Creek and Wappasening Creek 12

4. Interstate streams along the New York/Pennsylvania border between North Fork Cowanesque River and Tioga River 13

5. Interstate streams along the Pennsylvania/Maryland border ... 14

6. Parameters exceeding water quality standards 20

TABLES

Page

Table 1.--Interstate streams in the Susquehanna River basin 5

2.--Station locations and rationales 8

3.--Monitored parameters 16

4.--Water quality standards 20

5.--Water quality summary Susquehanna River at Windsor, N.Y. 25

6.--Water quality summary Cascade Creek at Lanesboro, Pa. 26

7.--Water quality summary Trowbridge Creek Great Bend, Pa. 27

8.--Water quality summary Snake Creek at Brookdale, Pa. 28

9.--Water quality summary Little Snake Creek at Brackney, Pa. 29

10.--Water quality summary Susquehanna River at Kirkwood, N.Y. 30

11.--Water quality summary Choconut Creek at Vestal Center, N.Y. .. 31

12.--Water quality summary Apalachin Creek at Little Meadows, Pa. . 32

13.--Water quality summary Wappasening Creek at Nichols, N.Y. 33

14.--Water quality summary Cayuta Creek at Waverly, N.Y. 34

15.--Water quality summary North Fork Cowanesque River at North Fork, Pa. 35

16.--Water quality summary Troups Creek at Austinburg, Pa. 36

17.--Water quality summary Holden Creek at Woodhull, N.Y. 37

18.--Water quality summary Cowanesque River at Lawrenceville, Pa. . 38

19.--Water quality summary Tioga River at Lindley, N.Y. 38

20.--Water quality summary Seeley Creek at Seeley Creek, N.Y. 40

21.--Water quality summary South Creek at Fassett, Pa. 41

22.--Water quality summary Bentley Creek at Wellsburg, N.Y. 42

23.--Water quality summary Chemung River at Chemung, N.Y. 43

24.--Water quality summary Susquehanna River at Sayre, Pa. 44

TABLES--Continued

Page

Table 25.--Water quality summary South Branch Conewago Creek at Bandanna, Pa. 45

26.--Water quality summary Long Arm Creek at Bandanna, Pa. 46

27.--Water quality summary Susquehanna River at Marietta, Pa. 47

28.--Water quality summary Scott Creek at Bandanna, Pa. 48

29.--Water quality summary Conowingo Creek at Pleasant Grove, Pa. . 50

30.--Water quality summary Octoraro Creek at Rising Sun, Md. 51

31.--Water quality summary Ebaughs Creek at Stewartstown, Pa. 52

32.--Water quality summary Deer Creek at Gorsuch Mills, Md. 53

33.--Water quality aummary Big Branch Deer Creek at Fawn Grove, Pa. 54

34.--Water quality summary Falling Branch Deer Creek at Fawn Grove, Pa. 55

35.--Water quality summary Susquehanna River at Conowingo, Md. 56

TABLES IN APPENDIX A

A1.--Macroinvertebrate data for Susquehanna River at Windsor, N.Y. 61

A2.--Water quality data for Susquehanna River at Windsor, N.Y. 63

A3.--Macroinvertebrate data for Susquehanna River at Kirkwood, N.Y. 64

A4.--Water quality data for Susquehanna River at Kirkwood, N.Y. ... 66

A5.--Macroinvertebrate data for Cayuta Creek at Waverly, N.Y. 67

A6.--Water quality data for Cayuta Creek at Waverly, N.Y. 68

A7.--Macroinvertebrate data for Troups Creek at Austinburg, Pa. ... 69

A8.--Water quality data for Troups Creek at Austinburg, Pa. 70

A9.--Macroinvertebrate data for Cowanesque River at Lawrenceville, Pa. 71

A10.--Water quality data for Cowanesque River at Lawrenceville, Pa. 72

A11.--Macroinvertebrate data for Tioga River at Lindley, N.Y. 73

TABLES IN APPENDIX A--Continued

Page

Table A12.--Water quality data for Tioga River at Lindley, N.Y. 74

A13.--Macroinvertebrate data for Chemung River at Chemung, N.Y. ... 75

A14.--Water quality data for Chemung River at Chemung, N.Y. 77

A15.--Macroinvertebrate data for Susquehanna River at Sayre, Pa. .. 78

A16.--Water quality data for Susquehanna River at Sayre, Pa. 79

A17.--Macroinvertebrate data for Susquehanna River at Marietta, Pa. 80

A18.--Water quality data for Susquehanna River at Marietta, Pa. ... 81

A19.--Macroinvertebrate data for Scott Creek at Delta, Pa. 82

A20.--Water quality data for Scott Creek at Delta, Pa. 83

A21.--Macroinvertebrate data for Conowingo Creek at Pleasant Grove, Pa. 84

A22.--Water quality data for Conowingo Creek at Pleasant Grove, Pa. 85

A23.--Macroinvertebrate data for Octoraro Creek at Rising Sun, Md. 86

A24.--Water quality Data for Octoraro Creek at Rising Sun, Md. 87

A25.--Macroinvertebrate Data for Ebaughs Creekat Stewartstown, Pa. 88

A26.--Water quality data for Ebaughs Creek at Stewartstown, Pa. ... 89

A27.--Macroinvertebrate data for Deer Creek at Gorsuch Mills, Md. . 90

A28.--Water quality data for Deer Creek at Gorsuch Mills, Md. 92

A29.--Water quality data for Susquehanna River at Conowingo, Md. .. 93

TABLES IN APPENDIX B

Page

Table B1.--Macroinvertebrate data for Cascade Creek at Lanesboro, Pa., 1988-90 97

B2.--Water quality data for Cascade Creek at Lanesboro, Pa., 1988-90 98

B3.--Macroinvertebrate data for Trowbridge Creek Great Bend, Pa., 1988-90 99

B4.--Water quality data for Trowbridge Creek Great Bend, Pa., 1988-90 100

B5.--Macroinvertebrate data for Snake Creek at Brookdale, Pa., 1986-90 101

B6.--Water quality data for Snake Creek at Brookdale, Pa., 1986-90 103

B7.--Macroinvertebrate data for Little Snake Creek at Brackney, Pa., 1988-90 104

B8.--Water quality data for Little Snake Creek at Brackney, Pa., 1988-90 105

B9.--Macroinvertebrate data for Choconut Creek at Vestal Center, N.Y., 1988-90 106

B10.--Water quality data for Choconut Creek at Vestal Center, N.Y., 1988-90 107

B11.--Macroinvertebrate data for Apalachin Creek at Little Meadows, Pa., 1988-90 108

B12.--Water quality data for Apalachin Creek at Little Meadows, Pa., 1988-1990 109

B13.--Macroinvertebrate data for Wappasening Creek at Nichols, N.Y., 1988-90 110

B14.--Water quality data for Wappasening Creek at Nichols, N.Y., 1988-90 111

B15.--Macroinvertebrate data for North Fork Cowanesque River at North Fork, Pa., 1988-90 112

B16.--Water quality data for North Fork Cowanesque River at North Fork, Pa., 1988-90 113

TABLES IN APPENDIX B--Continued

Page

Table B17.--Macroinvertebrate data for Holden Creek at Woodhull, N.Y., 1988-90 114

B18.--Water quality data for Holden Creek at Woodhull, N.Y., 1988-90 115

B19.--Macroinvertebrate data for Seeley Creek at Seeley Creek, N.Y., 1986-90 116

B20.--Water quality data for Seeley Creek at Seeley Creek, N.Y., 1986-90 118

B21.--Macroinvertebrate data for South Creek at Fassett, Pa., 1988-90 119

B22.--Water quality data for South Creek at Fassett, Pa., 1988-90 . 120

B23.--Macroinvertebrate data for Bentley Creek at Wellsburg, N.Y., 1986-90 121

B24.--Water quality data for Bentley Creek at Wellsburg, N.Y., 1986-90 122

B25.--Macroinvertebrate data for South Branch Conewago Creek at Bandanna, Pa., 1988-90 123

B26.--Water quality data for South Branch Conewago Creek at Bandanna, Pa., 1988-90 124

B27.--Macroinvertebrate data for Long Arm Creek at Bandanna, Pa., 1988-90 125

B28.--Water quality data for Long Arm Creek at Bandanna, Pa. 1988-90 126

B29.--Macroinvertebrate data for Big Branch Deer Creek at Fawn Grove, Pa., 1988-90 127

B30.--Water quality data for Big Branch Deer Creek at Fawn Grove, Pa., 1988-90 128

B31.--Macroinvertebrate data for Falling Branch Deer Creek at Fawn Grove, Pa., 1988-90 129

B32.--Water quality sata for Falling Branch Deer Creek at Fawn Grove, Pa., 1988-90 130

ABSTRACT

Water samples were collected from thirty five stations on interstate streams in water year 1990. Streams judged to have a high potential for degradation were sampled every other month. Streams judged to have a moderate potential for degradation were sampled once during July and August, 1990. Benthic macroinvertebrates were sampled from each station in July and August 1990. The data collected are used 1) to assess compliance with water quality standards; 2) to assess impacts on water quality; 3) to characterize ambient and seasonal stream quality; and 4) to access future trends.

Scott Creek is the only interstate stream having poor water quality. Untreated sewage discharges from Cardiff, Md., impairs water quality and biological conditions. The Cowanesque River exhibits biological impacts due to Cowanesque Lake, but impacts on water quality are minor. The Chemung River and Cayuta Creek have moderate macroinvertebrate impairment and elevated chemical concentrations due to waste water discharges. Acid mine drainage to the Tioga River contributes to a moderately impaired biological community and to elevated metal concentrations. Elevated chemical concentrations were observed in the Susquehanna River at Sayre and Conowingo Creek; however, no macroinvertebrate impairment was observed. Troups Creek, Trowbridge Creek, Seeley Creek, and the Susquehanna River at Marietta showed varying degrees of macroinvertebrate impairment, but no specific causes were indicated by water quality data. Most interstate streams have good water quality. Only 67 of the 2,403 analyses exceeded water quality standards. Aluminum most commonly exceeded standards.

INTRODUCTION

The Susquehanna River Basin Commission (SRBC) reviews projects and policies for potential impacts on interstate water resources in the Susquehanna River Basin. Current water quality data are needed to conduct these reviews. However, monitoring programs conducted by New York, Pennsylvania, and Maryland do not cover all of the interstate streams and do not produce comparable data. Thus, SRBC established a monitoring program to collect data needed to assess potential impacts on the water quality of interstate streams. This ongoing program is partially funded through a grant from the Environmental Protection Agency.

The monitoring program includes periodic collection of water and biological samples from interstate streams. Chemical data are used to assess compliance with state water quality standards; to characterize stream quality and seasonal variations; and to build a database for the future assessment of water quality trends. Biological conditions are monitored by assessing benthic macroinvertebrate populations. Benthic macroinvertebrates provide a measure of a stream's biological health and serve as indicators of water quality.

Monitoring began in April 1986. Results are reported for Water Years (WY) that run from October to September (McMorran, 1988; McMorran and Bollinger, 1989; McMorran and Bollinger, 1990) This report covers WY-1990 from October 1, 1989 to September 30, 1990.

BASIN GEOGRAPHY

The Susquehanna River Basin is the largest river basin on the Atlantic Coast of the United States; draining 27,580 square miles (figure 1). The Susquehanna River originates at the outlet of Otsego Lake, Cooperstown, New

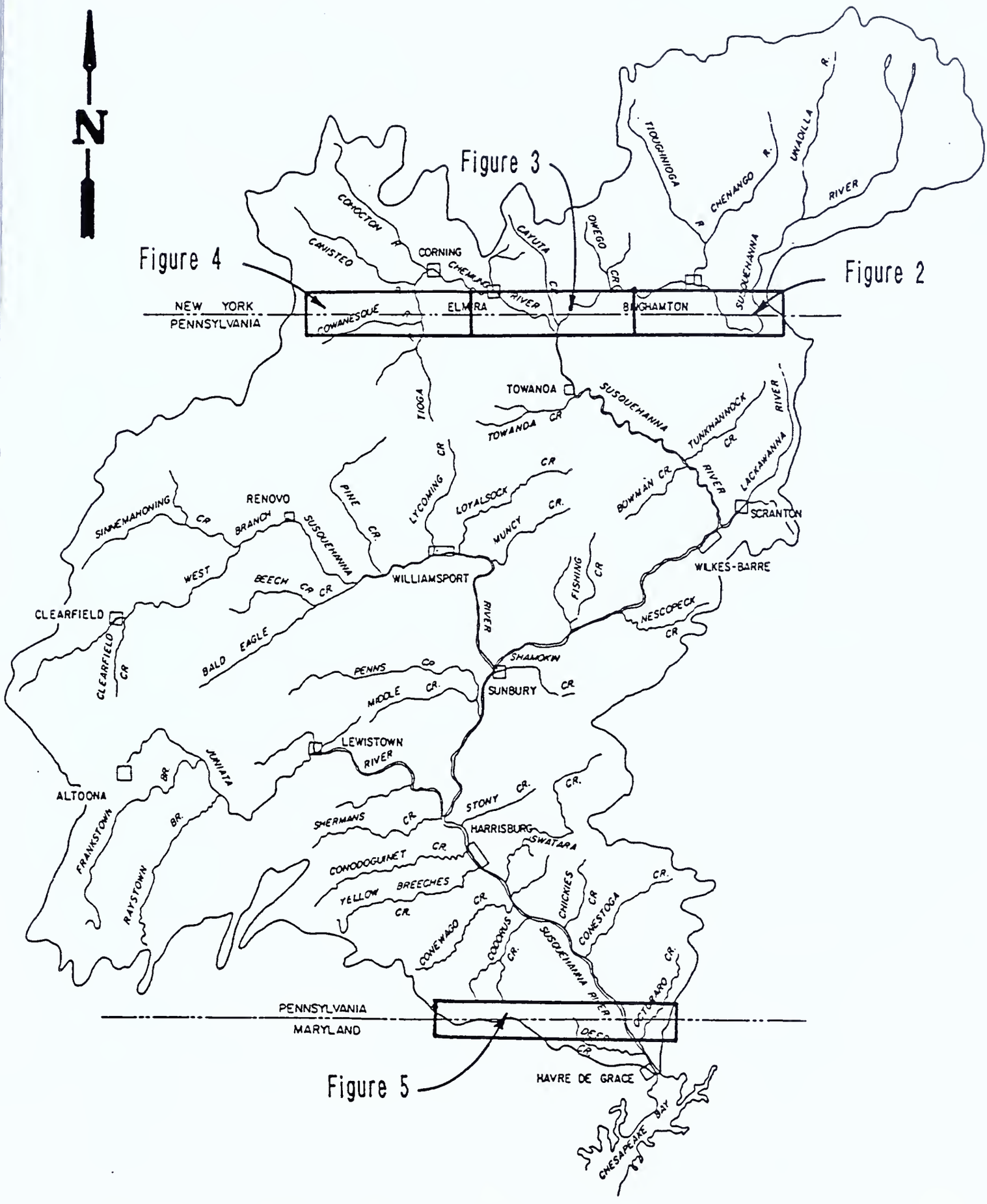


FIGURE 1.--Map showing Susquehanna River basin

York and flows 450 miles through New York, Pennsylvania and Maryland to the Chesapeake Bay at Havre de Grace, Maryland. Eighty-three streams cross state lines in the basin (table 1). Some streams bisect the state lines at several places, contributing to a total of 91 crossings. At 45 of these locations, streams flow from New York into Pennsylvania. Twenty-two reaches cross from Pennsylvania into New York, 15 from Pennsylvania into Maryland, and nine from Maryland into Pennsylvania. Many streams are small; 32 are unnamed.

METHODS

Sampling frequency

Stream stations sampled during WY-1990 are listed in table 2 and shown on figures 2 through 5. In WY-1989, interstate steams were divided into three groups. Group 1 stations were on streams with impaired water quality or where a high potential for degradation was judged to exist. Water samples were collected from Group 1 stations every other month with the exception of the months of January and February. Sampling was alternated so that streams along the New York/Pennsylvania border were sampled one month (March, May, July, September, and November) and streams along the Pennsylvania/Maryland border were collected the following month (April, June, August, October, and December). Macroinvertebrates were collected at Group 1 stations during July and August 1990. Group 2 stations were on streams judged to have moderate potential for impacts. Water quality and macroinvertebrate samples were obtained from Group 2 stations once a year between July 24 and August 2, 1990. Group 3 streams were judged to have a low potential for impacts. Consequently, they were not sampled, but were visually inspected for signs of degradation.

TABLE 1.--Interstate streams in the Susquehanna River basin

Streams Between New York and Pennsylvania	Monitoring Group	Flow Direction (from -> to)
Apalachin Creek	2	Pa.->N.Y.
Babcock Run	3	N.Y.->Pa.
Bentley Creek	2	Pa.->N.Y.
Bill Hess Creek	3	N.Y.->Pa.
Bird Creek	3	Pa.->N.Y.
Biscuit Hollow	3	N.Y.->Pa.
Briggs Hollow Run	3	N.Y.->Pa.
Bulkley Brook	3	N.Y.->Pa.
Camp Brook	3	N.Y.->Pa.
Cascade Creek	2	N.Y.->Pa.
Cayuta Creek	1	N.Y.->Pa.
Chemung River	1	N.Y.->Pa.->N.Y.->Pa.
Choconut Creek	2	Pa.->N.Y.
Cook Hollow	3	N.Y.->Pa.
Cowanesque River	1	Pa.->N.Y.
Deep Hollow Brook	3	N.Y.->Pa.
Denton Creek	3	N.Y.->Pa.
Dry Brook	3	N.Y.->Pa.
Holden Creek	2	N.Y.->Pa.
Little Snake Creek	2	Pa.->N.Y.
Little Wappasening Creek	3	Pa.->N.Y.
North Fork Cowanesque River	2	N.Y.->Pa.
Parks Creek	3	Pa.->N.Y.

TABLE 1.--Interstate streams in the Susquehanna River basin--Continued

Streams Between New York and Pennsylvania	Monitoring Group	Flow Direction (from -> to)
Prince Hollow Run	3	N.Y.->Pa.
Red House/Beagle Hollow	3	N.Y.->Pa.
Russell Run	3	N.Y.->Pa.
Sackett Creek	3	Pa.->N.Y.
Seeley Creek	2	Pa.->N.Y.
South Creek	2	Pa.->N.Y.
Snake Creek	2	Pa.->N.Y.
Strait Creek	3	N.Y.->Pa.
Susquehanna River	1	N.Y.->Pa.->N.Y.->Pa.
Tioga River	1	Pa.->N.Y.
Troups Creek	1	N.Y.->Pa.
Trowbridge Creek	2	N.Y.->Pa.
Wappasening Creek	2	Pa.->N.Y.
White Branch	3	N.Y.->Pa.
White Hollow	3	Pa.->N.Y.
17 Unnamed tributaries	3	N.Y.->Pa.
2 Unnamed tributaries	3	Pa.->N.Y.
2 Unnamed tributaries	3	Pa.->N.Y.->Pa.
1 Unnamed tributary	3	N.Y.->Pa.->N.Y.

TABLE 1.--Interstate streams in the Susquehanna River basin--Continued

Streams Between New York and Pennsylvania	Monitoring Group	Flow Direction (from -> to)
Big Branch Deer Creek	2	Pa.->Md.
Conowingo Creek	1	Pa.->Md.
Deer Creek	1	Pa.->Md.
Ebaughs Creek	1	Pa.->Md.
Falling Branch Deer Creek	2	Pa.->Md.
Island Branch	3	Pa.->Md.
Long Arm Creek	2	Md.->Pa.
Octoraro Creek	1	Pa.->Md.
Scott Creek	1	Md.->Pa.
South Branch Conewago Creek	2	Md.->Pa.
Susquehanna River	1	Pa.->Md.
6 Unnamed tributaries	3	Md.->Pa.
7 Unnamed tributaries	3	Pa.->Md.

TABLE 2.--Stream stations sampled during Water Year 1990 and sampling rationale

Station	Stream and Location	Monitoring Group	Rationale
SUSQ 10.0	Susquehanna River Conowingo, Md.	1	Bracket hydroelectric dams near state line.
SUSQ 44.5	Susquehanna River Marietta, Pa.	1	Bracket hydroelectric dams near the state line.
SUSQ 289.1	Susquehanna River Sayre, Pa.	1	Large drainage area (4,933 sq. mi.); municipal and industrial discharges.
SUSQ 340.0	Susquehanna River Kirkwood, N.Y.	1	Large drainage area (2,232 sq. mi.); historical pollution due to sewage from Lanesboro, Oakland, Susquehanna, Great Bend and Hallstead.
SUSQ 365.0	Susquehanna River Windsor, N.Y.	1	Large drainage area (1,882 sq. mi.); municipal discharges from Cooperstown, Sidney, Bainbridge and Afton.
OCTO 6.6	Octoraro Creek Rising Sun, Md.	1	High nutrient loads due to agricultural runoff from New Bridge, Md. Water quality impacts from Octoraro Lake. Nonpoint runoff to Chesapeake Bay.
CNWG 4.4	Conowingo Creek Pleasant Grove, Pa.	1	High nutrient loads and other agricultural runoff. Nonpoint runoff to Chesapeake Bay.
SCTT 3.0	Scott Creek Delta, Pa.	1	Pollution from untreated sewage.
FBDC 4.1	Falling Branch Deer Creek, Fawn Grove, Pa.	2	Nonpoint runoff to Chesapeake Bay.
BBDC 4.1	Big Branch Deer Creek Fawn Grove, Pa.	2	Nonpoint runoff to Chesapeake Bay.
EBAU 1.5	Ebaughs Creek Stewartstown, Pa.	1	Municipal discharge from Stewartstown. Nonpoint runoff to Chesapeake Bay.

TABLE 2.--Stream stations sampled during Water Year 1990 and sampling rationale--Continued

Station		Stream and Location	Monitoring Group	Rationale
DEER	44.5	Deer Creek Gorsuch Mills, Md.	1	Past pollution from Gorsuch Mills, Md., Stewartstown, Pa. Nonpoint runoff to Chesapeake Bay.
SBCC	20.4	South Branch Conewago Creek Bandanna, Pa.	2	Monitor for potential water quality impacts.
LNGA	2.5	Long Arm Creek Bandanna, Pa.	2	Monitor for potential water quality impacts.
CASC	1.6	Cascade Creek Lanesboro, Pa.	2	Monitor for potential water quality impacts.
TROW	1.6	Trowbridge Creek Great Bend, Pa.	2	Monitor for potential water quality impacts.
SNAK	2.3	Snake Creek Brookdale, Pa.	2	Monitor for potential water quality impacts.
LSNK	7.6	Little Snake Creek Brackney, Pa.	2	Monitor for potential water quality impacts.
CHOC	9.1	Choconut Creek Vestal Center, N.Y.	2	Monitor for potential water quality impacts.
APAL	6.9	Apalachin Creek Little Meadows, Pa.	2	Monitor for potential water quality impacts.
WAPP	2.6	Wappasening Creek Nichols, N.Y.	2	Monitor for potential water quality impacts.
CAYT	1.7	Cayuta Creek Waverly, N.Y.	1	Municipal discharge from Waverly.
CHEM	12.0	Chemung River Chemung, N.Y.	1	Municipal and industrial discharges from Elmira.
BNTY	0.9	Bentley Creek Wellsburg, N.Y.	2	Monitor for potential water quality impacts.
SOUT	7.8	South Creek Fassett, Pa.	2	Monitor for potential water quality impacts.

TABLE 2.--Stream stations sampled during Water Year 1990 and sampling rationale--Continued

Station	Stream and Location	Monitoring Group	Rationale
SEEL 10.3	Seeley Creek Seeley Creek, N.Y.	2	Monitor for potential water quality impacts.
TIOG 10.8	Tioga River Lindley, N.Y.	1	Pollution from acid mine discharges and impacts from flood control reservoirs.
COWN 2.2	Cowanesque River Lawrenceville, Pa.	1	Impacts from flood control reservoir.
HLDN 3.5	Holden Creek Woodhull, N.Y.	2	Monitor for potential water quality impacts.
TRUP 4.5	Troups Creek Austinburg, Pa.	1	High turbidity and moderately impaired macroinvertebrate populations.
NFCR 7.6	North Fork Cowanesque River North Fork, Pa.	2	Monitor for potential water quality impacts.

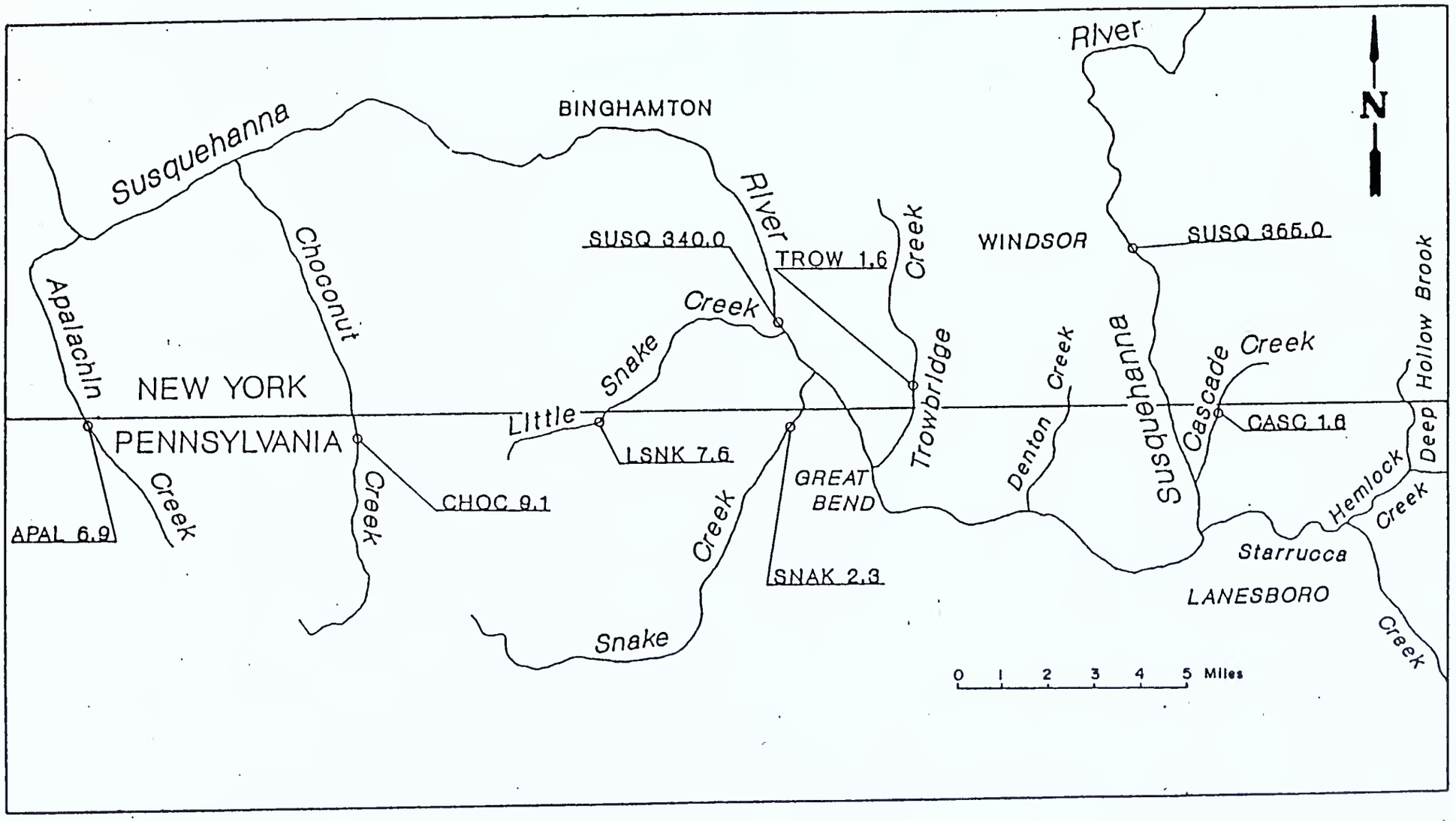


FIGURE 2.--Interstate streams along the New York/Pennsylvania border between Cascade Creek and Apalachin Creek

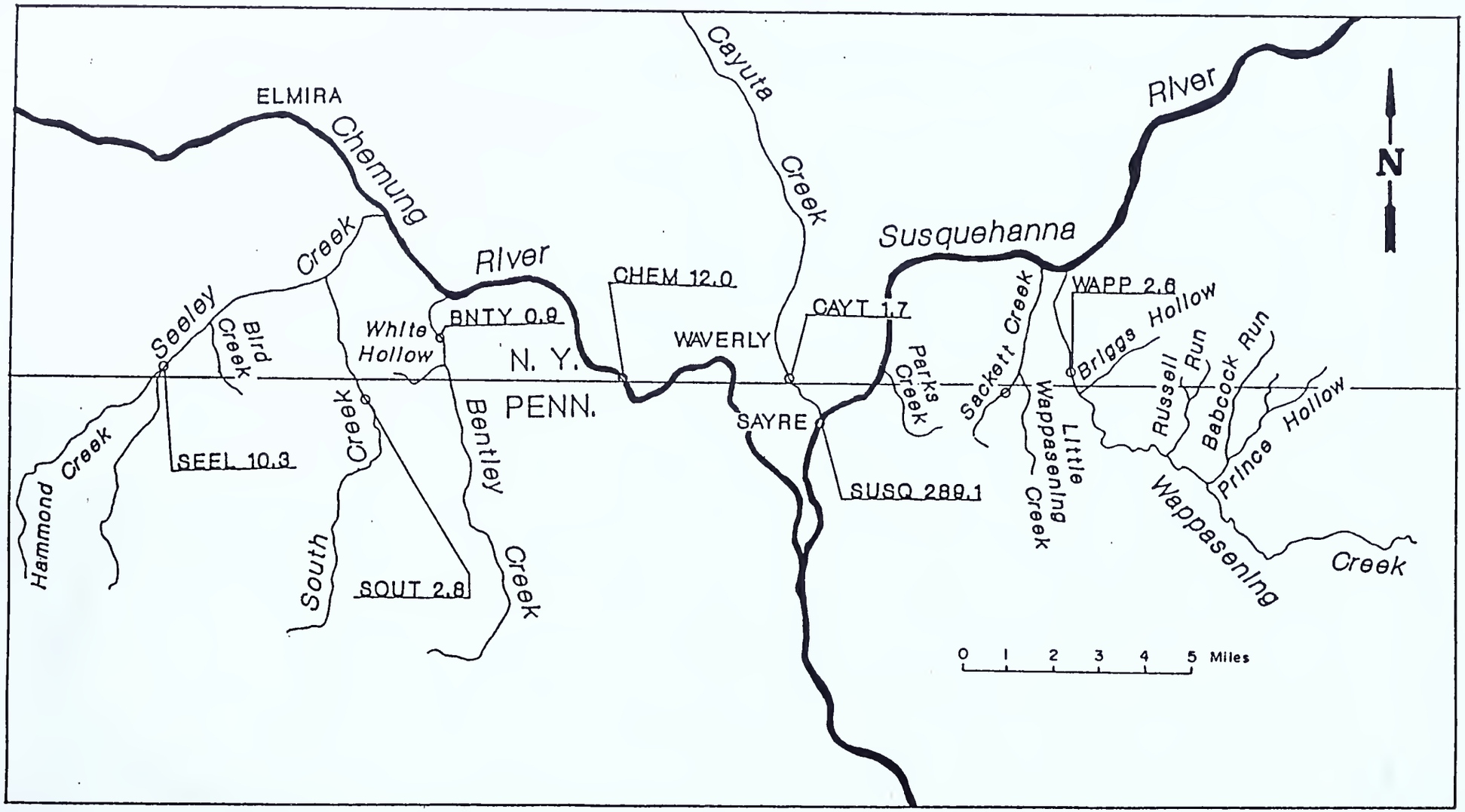


FIGURE 3.--Interstate streams along the New York/Pennsylvania border between Seeley Creek and Wappasening Creek

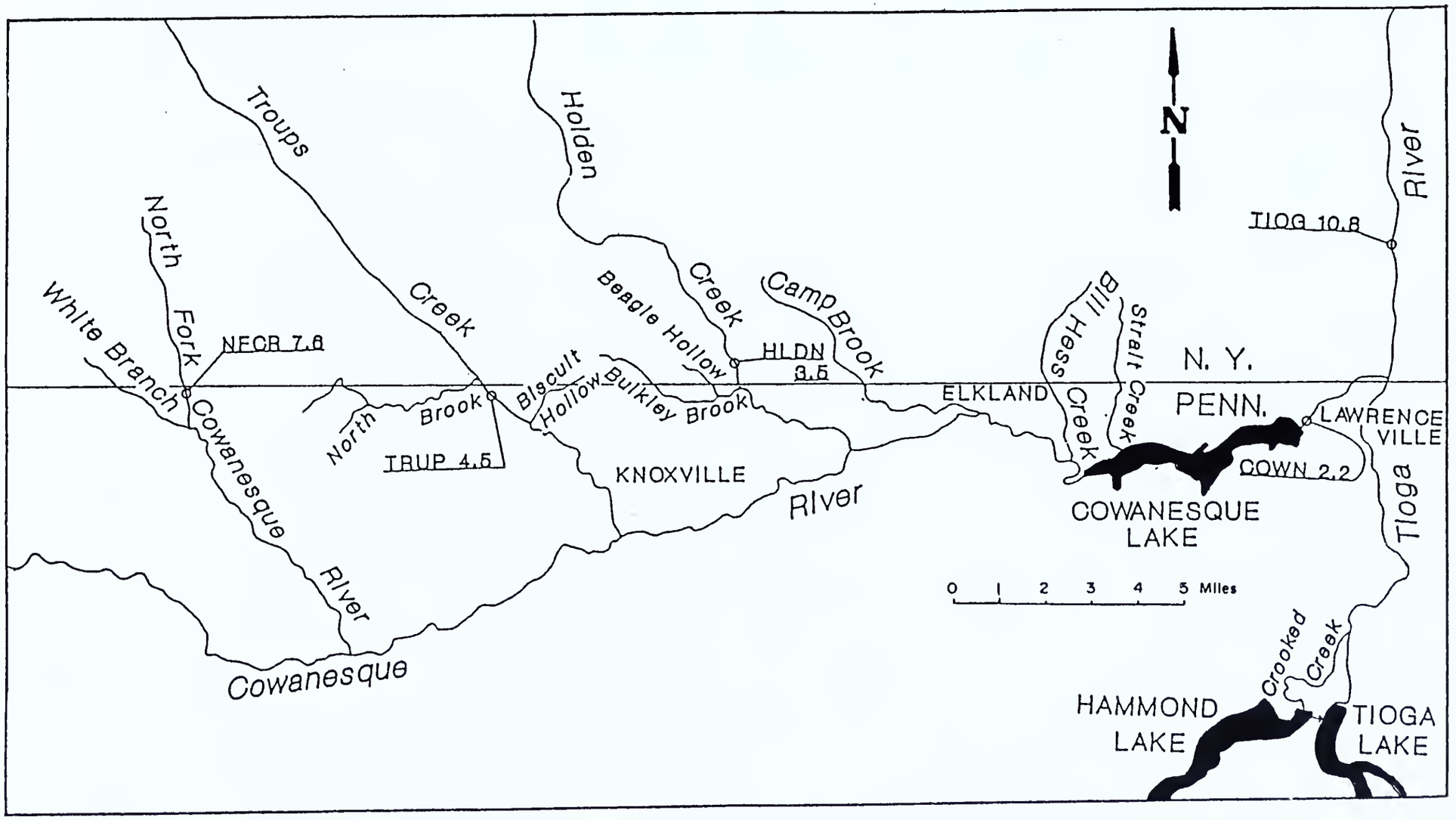


FIGURE 4.--Interstate streams along the New York/Pennsylvania border between North Fork Cowanesque River and Tioga River

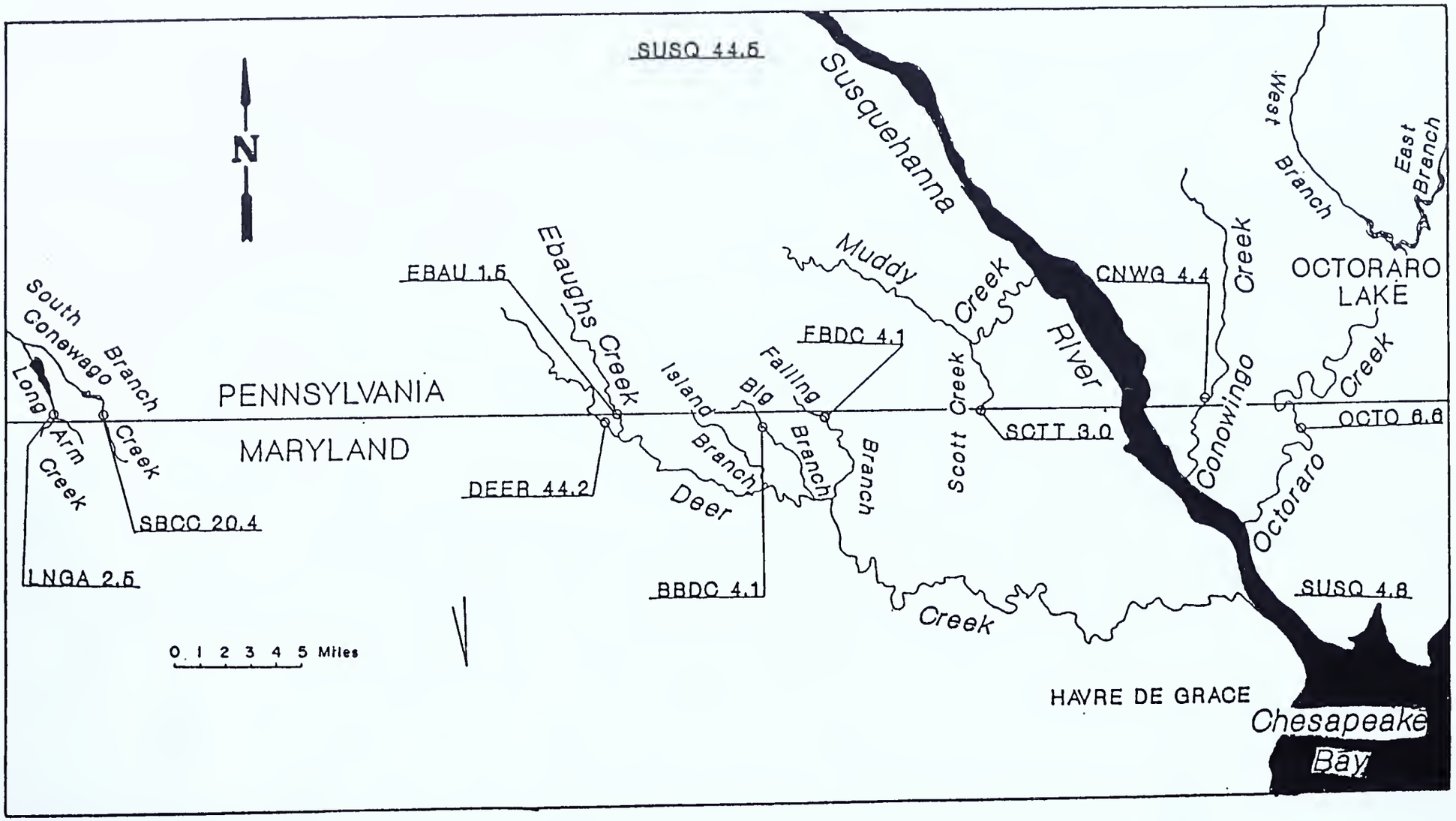


FIGURE 5.--Interstate streams along the Pennsylvania/Maryland border

Stream Discharge.

Stream discharge was measured at all stations unless high stream flows made access impossible. Several stations are located near United States Geological Survey (USGS) stream gages. These stations include: the Susquehanna River at Windsor, N.Y., Kirkwood, N.Y., Sayre, Pa., Marietta, Pa., and Conowingo, Md.; the Chemung River at Chemung, N.Y.; the Tioga River at Lindley, N.Y.; and the Cowanesque River at Lawrenceville, Pa. Stream discharges from USGS gaging stations are reported as mean daily discharges in cubic feet per second (cfs). At stations that are not located near gaging stations instantaneous discharge was measured at the time of sampling using standard USGS procedures.

Water samples

Water samples were collected at each of the sites to measure nutrient and metal concentrations. The chemical and physical parameters are listed in table 3. Water samples were collected using a depth integrating sampler. Composite samples were obtained by collecting eight depth integrated samples across the stream channel and combining them in a churn splitter, which was previously rinsed with distilled water. Sample water was thoroughly mixed in the churn splitter and collected for nutrient analysis in two 500 ml bottles, one filtered and one raw. Samples for metals analysis were collected in two acid rinsed 500 ml bottles, one filtered and one whole water sample. Samples to be used for metals analysis were fixed with 2.0 ml of nitric acid (HNO_3). A cellulose nitrate filter with .45 micrometer pore size was used to obtain the filtrate for laboratory analysis. New filter paper was used at each station. The samples were chilled on ice and sent to the Pennsylvania Department of Environmental Resources (Pa. DER), Bureau of Laboratories in Harrisburg, Pa.

TABLE 3.--Monitored parameters

Parameter	STORET Code
Physical	
Discharge	00060
Temperature	00010
Chemical	
Field Analyses	
Conductivity	00095
Dissolved Oxygen	00300
pH	00400
Alkalinity	00410
Acidity	00435
Free chlorine	50064
Laboratory Analyses	
Biochemical Oxygen Demand	00310
Solids - Dissolved	00515
Total	00500
Ammonia as Nitrogen - Dissolved	00608
Total	00610
Nitrite as Nitrogen - Dissolved	00613
Total	00615
Nitrate as Nitrogen - Dissolved	00618
Total	00620
Kjeldahl Nitrogen - Dissolved	00623
Total	00625
Phosphorus - Dissolved	00666
Total	00665
Orthophosphate - Dissolved	00671
Total	70507
Organic Carbon - Total	00680
Magnesium - Total	00927
Chloride - Total	00940
Sulfate - Total	00945
Iron - Dissolved	01046
Total	01045
Manganese - Dissolved	01056
Total	01055
Aluminum - Dissolved	01106
Total	01105
Turbidity	82079

Field chemistry

Temperature, dissolved oxygen, conductivity, pH, alkalinity, acidity, and chlorine were measured in the field. Temperature and dissolved oxygen were measured using a YSI model 54A dissolved oxygen meter. The dissolved oxygen meter was calibrated at the beginning of each day that water samples were collected. A Beckman solu-bridge conductivity meter was used to measure conductivity. An Orion model 399A meter was used to measure pH. The pH meter was calibrated at the beginning of each day and randomly checked during the day. Alkalinity was determined by titrating a known volume of sample water to pH 4.5 with .02 normal sulfuric acid (H_2SO_4). Acidity was measured by titrating a known volume of sample water to pH 8.3 with .02 normal sodium hydroxide (NaOH). Total free chlorine was measured using a Lamotte 4497-DR, Model PC7-DR, chlorine test kit.

Macroinvertebrate sampling

Benthic macroinvertebrates were sampled at Group 1 and 2 stations between July 24 and August 2, 1990. Macroinvertebrates were sampled to provide an indicator of the biological condition of the stream. Macroinvertebrates are defined as aquatic insects and other invertebrates that are too large to pass through a #30 sieve. Both qualitative and quantitative macroinvertebrate collections were made at each site.

A kick screen was used to perform qualitative sampling. A seine was stretched across the current and a hoe was used to dislodge macroinvertebrates from the substrate. The current carried the dislodged macroinvertebrates into the seine. Macroinvertebrates were taken from the seine and preserved in alcohol for later identification in the laboratory.

Quantitative samples were obtained using a Surber sampler, a one-foot square metal frame with a #30 mesh net. The sampler was placed on the substrate in a shallow riffle. The substrate inside the frame was agitated to dislodge macroinvertebrates. Large rocks within the frame were scrubbed with a nylon brush to dislodge clinging macroinvertebrates. The current carried the macroinvertebrates into the net. The contents of the net were removed and placed in a bottle containing alcohol. The preserved specimens were stored and identified to generic level at a later date.

Data synthesis

Results of laboratory analyses for chemical parameters were compared to state water quality standards. In addition, a simple water quality index (WQI) was calculated, using procedures established by McMorran (1989). The WQI was used to make comparisons between sampling periods and stations within the same geographical region; therefore, the water quality data was separated into two groups. One group contained stations along the New York/Pennsylvania border and the other group contained stations along the Pennsylvania/Maryland border. The data in each group was sorted by parameter and ranked in increasing order of magnitude. The rank of each chemical analysis was divided by the total number of observations in the group to obtain a percentile. The WQI score was calculated by averaging all the percentile ranks for each sample.

Macroinvertebrate data was assessed using Rapid Bioassessment Protocols (Plafkin and others, 1989). The Rapid Bioassessment Protocols (RBP) improve interpretation of biological data by compiling a series of metrics which are then compared to a reference station. A relative score indicates varied degrees of impaired water quality. Station SNAK 2.3 (Snake Creek) was used as

the reference station for streams along the New York/Pennsylvania border. Snake Creek has the best biological conditions and most typifies the Northern Appalachian Plateau and Uplands Ecoregion (Omernik, 1987). For Pennsylvania/Maryland border streams, station SBCC 20.4 (South Branch Conewago Creek) was used as the reference station. South Branch Conewago Creek has the best biological conditions and most typifies the Northern Piedmont Ecoregion.

RESULTS

New York/Pennsylvania border streams

The water quality in most interstate streams continues to meet designated uses classes and water quality standards. A total of 2,403 water quality observations were made and only 67 exceeded water quality standards. Aluminum and iron failed to meet the standards most frequently (table 4, figure 6). Manganese, pH, and dissolved oxygen exceeded standards at several stations. Biological conditions in most streams indicate non-impaired or slightly impaired biological conditions.

A moderately impaired biological community exists in Cayuta Creek. Elevated nutrient concentrations observed in Cayuta Creek indicate that waste water loads from the Waverly sewage treatment facility may be affecting the macroinvertebrate population.

Waste water discharges from the City of Elmira contribute to high WQI values and slight to moderate macroinvertebrate impairment in the Chemung River.

The Cowanesque River continues to show signs of a severely degraded macroinvertebrate community below Cowanesque Reservoir. Increased phytoplankton production in the reservoir causes a shift to a filter feeding community downstream. Chemical data indicates that overall water quality in the Cowanesque River is good.

TABLE 4.--Water quality standards

Parameter	Number of Observations	Number Exceeding Standard	Standard
Total aluminum	89	4	N.Y. and Pa. chronic fish
		12	Pa. chronic fish.
		8	Md. chronic fish.
Dissolved aluminum	89	2	Pa. chronic fish.
		2	Md. chronic fish
Total iron	89	9	Pa. chronic fish.
Dissolved iron	89	3	Pa./N.Y. chronic human health
		2	N.Y. chronic fish.
		7	Pa. chronic human health
Total manganese	89	5	N.Y. chronic fish.
		2	Pa. chronic fish.
Dissolved manganese	89	4	N.Y. chronic fish.
		2	Pa. chronic fish.
pH	88	2	Pa./N.Y.
		1	Pa./Md.
		1	Md.
Dissolved oxygen	89	1	Md./Pa.

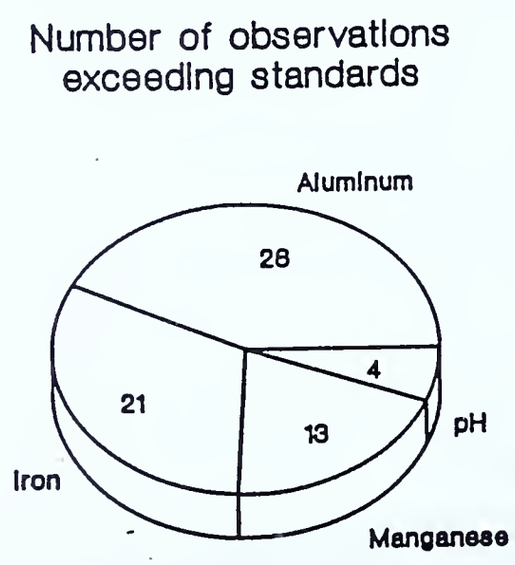


FIGURE 6. Parameters exceeding water quality standards

A moderately impaired biological community was found in Seeley Creek. Recent rechannelization of the stream bed probably led to the impairment of the macroinvertebrate population. Water quality in Seeley Creek is very good.

The Tioga River continues to be degraded by acid mine drainage, even though the Tioga-Hammond Reservoir greatly improves the water quality. High concentrations of sulfates and metals contribute to a moderately impaired macroinvertebrate community. High river flows prevented the collection of a representative macroinvertebrate sample. High water and strong currents forced the collection of macroinvertebrates near the bank where it probably would not have been inundated during normal seasonal flows.

Troups Creek suffers from a moderately impaired biological community. The macroinvertebrate population is dominated by pollution tolerant genera. Water quality data does not suggest any possible sources of degradation.

Trowbridge Creek contains good quality water, however, a moderately impaired biological community was found in the stream. This could be caused by the dumping of grass clippings from chemically treated lawns into the creek, as reported by a local resident during the field work. Grass clippings were observed throughout the stream at the time of sampling.

Wastewater discharges from the City of Binghamton, N.Y. affect the water quality of the Susquehanna River at Sayre, Pa. High nutrient concentrations were observed in the fall during periods of low flow. The waste water loads do not contribute to any impairment of the macroinvertebrate community.

Pennsylvania/Maryland border streams

The Susquehanna River at Marietta, Pa., shows signs of slight to moderate macroinvertebrate impairment. Chemical parameters do not indicate a specific cause associated with the impaired biological community. High iron and aluminum concentrations were measured; however, it is likely that the natural underlying geology in the lower basin may be responsible for these high values.

High WQI values reflect elevated nutrient concentrations in Conowingo Creek during periods of low flow. Dissolved and total nitrate concentrations were high throughout WY-1990. Agricultural land dominates the Conowingo Creek basin and probably leads to some nutrient enrichment in the stream. Macroinvertebrate analysis indicates that a slightly to non-impaired community exists in Conowingo Creek.

Water quality in Octoraro Creek has improved over the past two years. In previous years, moderately impaired biological communities and high concentrations of nutrients and metals were found in Octoraro Creek. Staff observed a healthier biological community and a reduction in metal and nutrient concentrations in WY-1990.

Scott Creek at Delta, Pa., continues to be severely degraded by raw sewage discharges from Cardiff, Md.. Chemical parameters were very high in every sample. A total of 12 observations exceeded water quality standards. Iron, aluminum, and manganese were the most common parameters that exceeded standards. WQI values were extremely high during fall and winter and most parameters exceeded 90th percentiles. These samples were collected during low flow conditions. Spring and summer runoff increased the stream flow and may have diluted pollutants, accounting for the lowered WQI. All WQI values, however, were much higher than most other streams. The macroinvertebrate

community is severely impaired by the raw sewage discharges. In 1990, only nine taxa were collected and the community is dominated by pollution tolerant species. A local resident reported to us that other materials are dumped into the stream in addition to the raw sewage discharges.

Station summaries are presented in tables 5 through 35. Included are listings of parameters exceeding water quality standards, WQI values and parameters that exceeded the 90th percentile at each station. Macroinvertebrate summaries and other comments are provided along with graphs showing historical comparisons for water quality and macroinvertebrate indices over the monitoring period.

Abbreviations for tables 5 through 35

Abbrev.	Parameter	Abbrev.	Parameter
ACID	Acidity		
BOD	Biochemical O2 Demand		
COND	Conductivity		
DAl	Dissolved Alumunim	TAl	Total Aluminum DCa
DCa	" Calcium	TCa	" Calcium
DCl	" Chloride	TCl	" Chloride DFe
DFe	" Iron	TFe	" Iron
DKN	" Kjeldahl N	TKN	" Kjeldahl N
DMg	" Magnesium	TMg	" Magnesium
DMn	" Manganese	TMn	" Manganese
DNH3	" Ammonia	TNH3	" Ammonia
DNO2	" Nitrite	TNO2	" Nitrite
DNO3	" Nitrate	TNO3	" Nitrate
DP	" Phosphorus	TP	" Phosphorus
DPO4	" Orthophosphate	TPO4	" Orthophosphate
DS	" Solids	TS	" Solids
DSO4	" Sulfate	TSO4	" Sulfate
		TOC	" Org. Carbon

WQI Water Quality Index

RBP Rapid Bioassessment Protocol

TABLE 5.--Water quality summary Susquehanna River at Windsor, N.Y.

Parameters Exceeding Standards

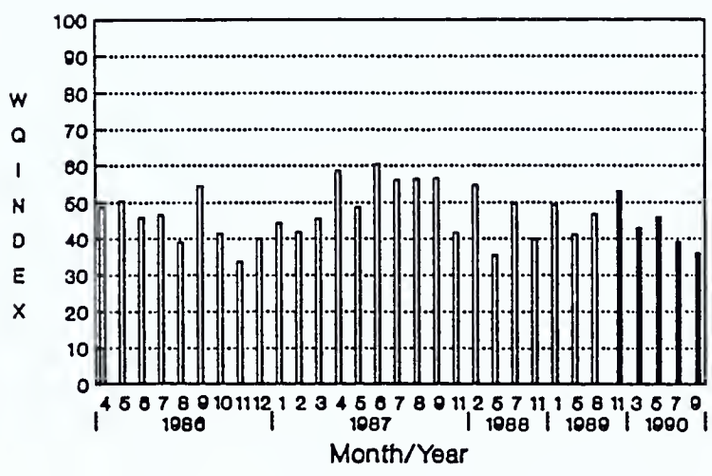
Parameter	Date	Value	Standard	State
None				

Date	WQ Index	Parameters Exceeding 90th Percentile
10/30/89	53	
03/06/90	43	
05/15/90	46	TFE TA1 DA1 TURB
07/23/90	39	
09/12/90	36	

Biological Summary

Number of taxa:	19
Diversity index:	2.30
RBP Score:	30
RBP Condition:	Slightly impaired

Water Quality Index



Biological Index

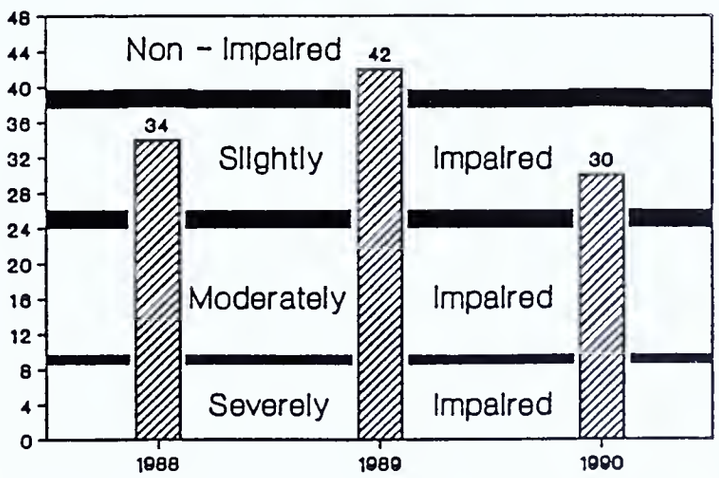


TABLE 6.--Water quality summary Cascade Creek at Lanesboro, Pa.

Parameters Exceeding Standards

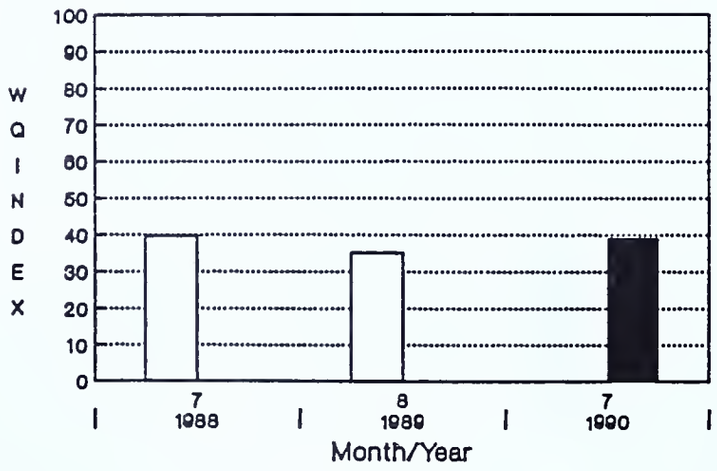
Parameter	Date	Value	Standard	State
Dfe	07/23/90	459 ug/l	300 ug/l	N.Y. and Pa. chronic human health and N.Y. chronic fish
TMn	07/23/90	851 ug/l	300 ug/l	N.Y. chronic fish

Date	WQ Index	Parameters Exceeding 90th Percentile
07/23/90	39	TOC TFe DFe TMn DMn

Biological Summary

Number of taxa:	15
Diversity index:	2.31
RBP Score:	24
RBP Condition:	Slightly impaired

Water Quality Index



Biological Index

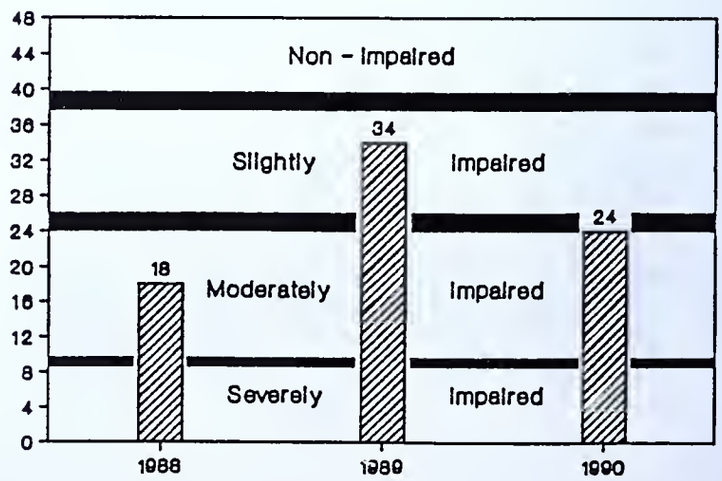


TABLE 7.--Water quality summary Trowbridge Creek at Great Bend, Pa.

Parameters Exceeding Standards

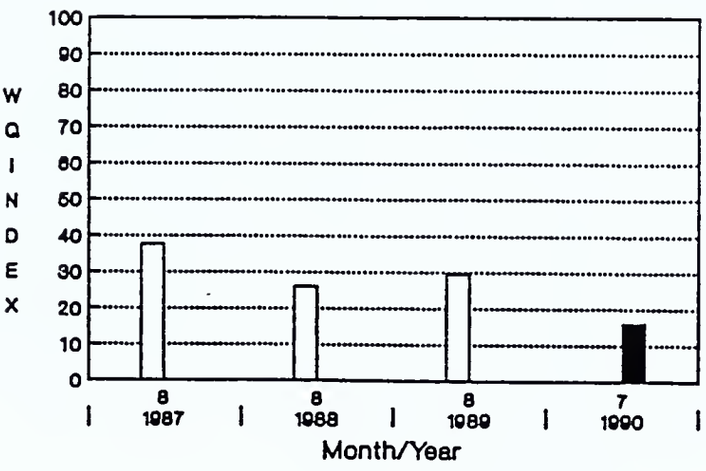
Parameter	Date	Value	Standard	State
None				

Date	WQ Index	Parameters Exceeding 90th
07/24/90	16	TP DP

Biological Summary

Number of taxa:	15
Diversity index:	2.16
RBP Score:	20
RBP Condition:	Moderately impaired

Water Quality Index



Biological Index

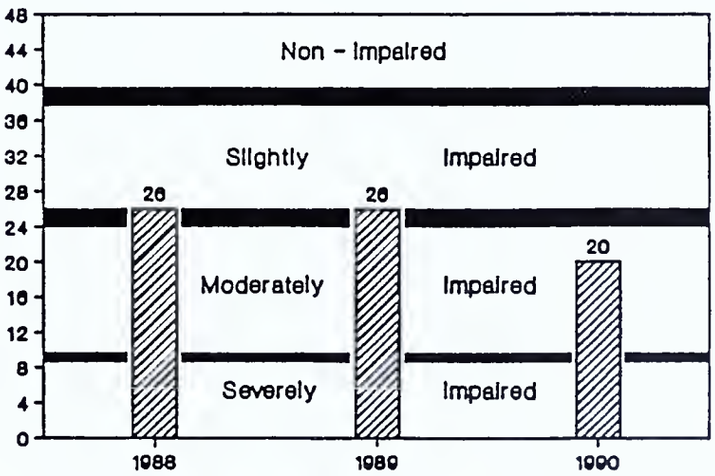


TABLE 8.--Water quality summary Snake Creek at Brookdale, Pa.

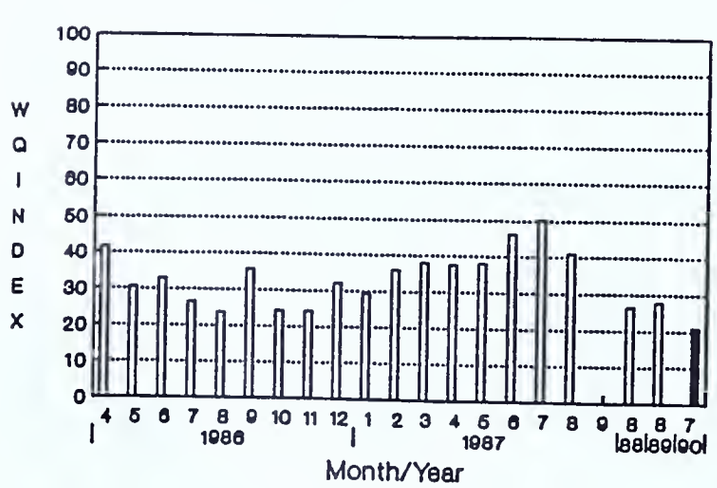
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
None				

Date	WQ Index	Parameters Exceeding 90th Percentile
07/23/90	21	DP

Biological Summary

Number of taxa:	26
Diversity index:	2.89
RBP Score:	46
RBP Condition:	Reference

Water Quality Index



Biological Index

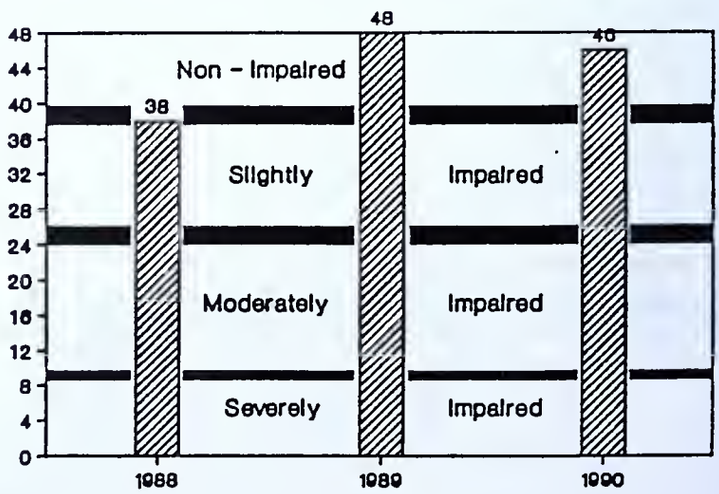


TABLE 9.--Water quality summary Little Snake Creek at Brackney, Pa.

Parameters Exceeding Standards

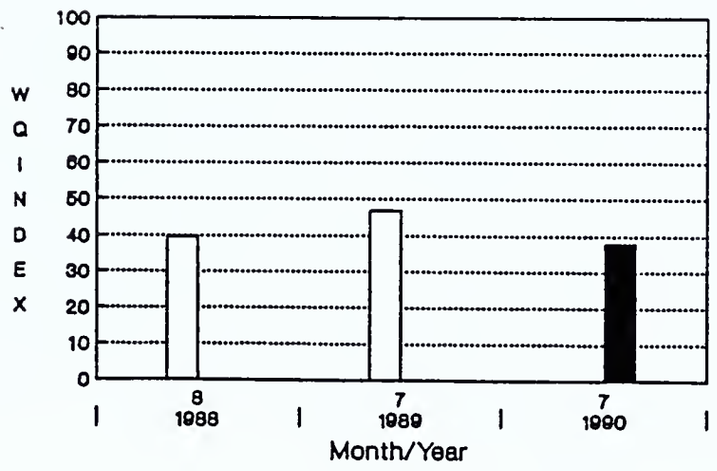
Parameter	Date	Value	Standard	State
DFe	07/24/90	648 ug/l	300 ug/l	N.Y. and Pa. chronic human health and N.Y. chronic fish

Date	WQ Index	Parameters Exceeding 90th Percentile
07/24/90	38	TOC DFe

Biological Summary

Number of taxa:	17
Diversity index:	2.47
RBP Score:	28
RBP Condition:	Slightly impaired

Water Quality Index



Biological Index

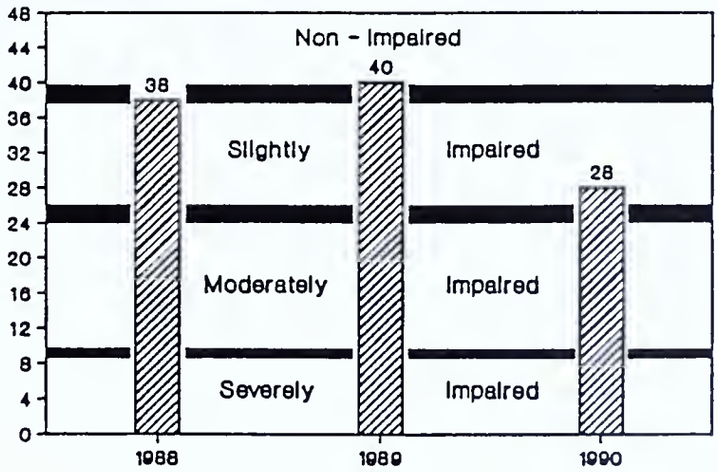


TABLE 10.--Water quality summary Susquehanna River at Kirkwood, N.Y.

Parameters Exceeding Standards

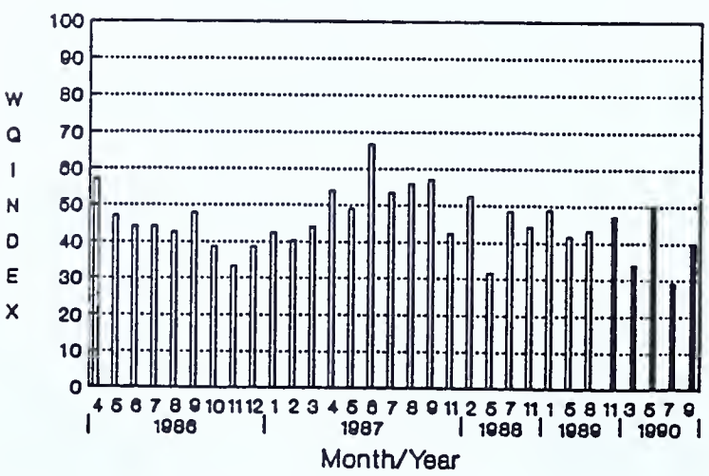
Parameter	Date	Value	Standard	State
TA1	05/15/90	1,050 ug/1	500 ug/1	N.Y. and Pa. chronic fish

Date	WQ Index	Parameters Exceeding 90th Percentile
10/30/89	47	DFe
03/06/90	34	
05/15/90	50	TFe TA1 DA1 TURB
07/23/90	29	
09/12/90	40	

Biological Summary

Number of taxa:	21
Diversity index:	2.45
RBP Score:	36
RBP Condition:	Slightly impaired

Water Quality Index



Biological Index

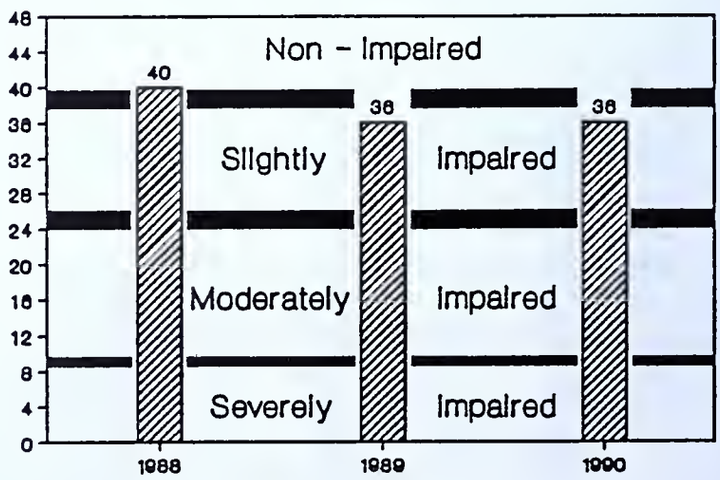


TABLE 11.--Water quality summary Choconut Creek at Vestal Center, N.Y.

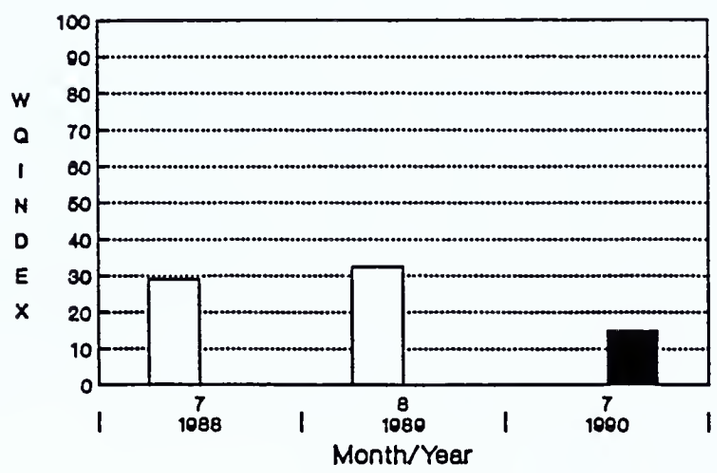
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
None				

Date	WQ Index	Parameters Exceeding 90th Percentile
07/24/90	15	

Biological Summary

Number of taxa:	21
Diversity index:	2.53
RBP Score:	34
RBP Condition:	Slightly impaired

Water Quality Index



Biological Index

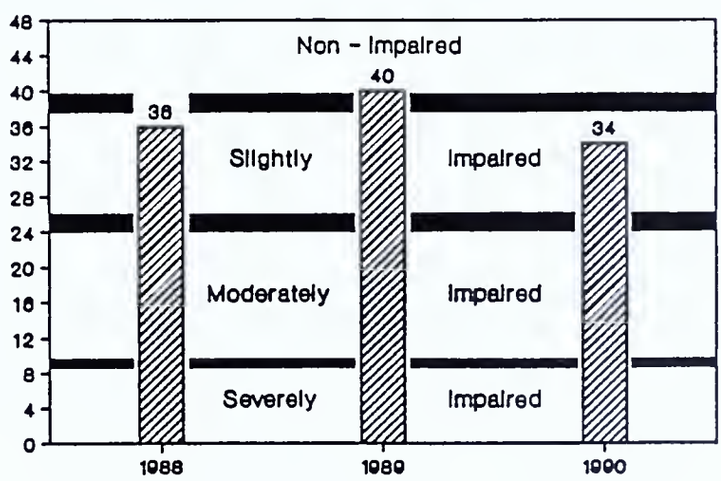


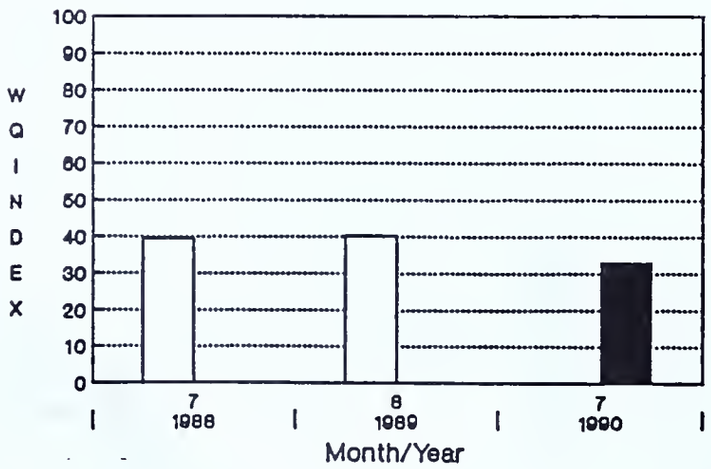
TABLE 12.--Water quality summary Apalachin Creek at Little Meadows, Pa.

Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
None				

Date	WQ Index	Parameters Exceeding 90th Percentile
07/24/90	33	

Biological Summary	
Number of taxa:	21
Diversity index:	2.59
RBP Score:	32
RBP Condition:	Slightly impaired

Water Quality Index



Biological Index

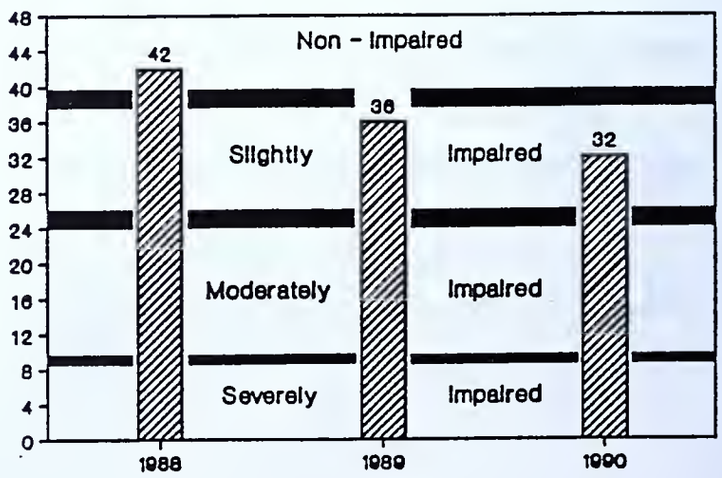


TABLE 13.--Water quality summary Wappasening Creek at Nichols, N.Y.

Parameters Exceeding Standards

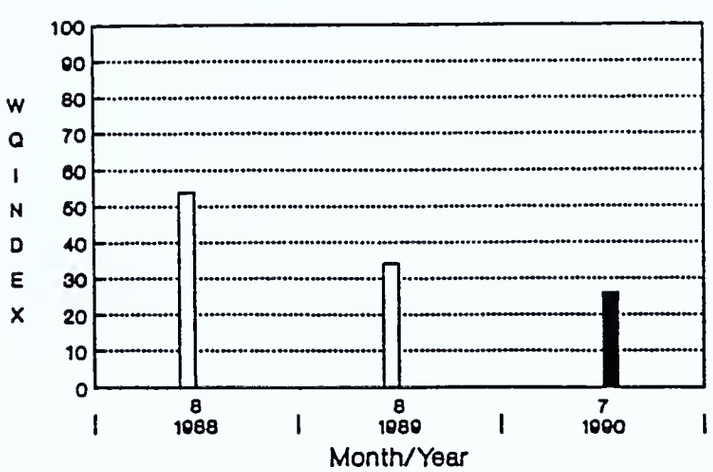
Parameter	Date	Value	Standard	State
None				

Date	WQ Index	Parameters Exceeding 90th Percentile
07/24/90	26	

Biological Summary

Number of taxa:	21
Diversity index:	2.59
RBP Score:	32
RBP Condition:	Slightly impaired

Water Quality Index



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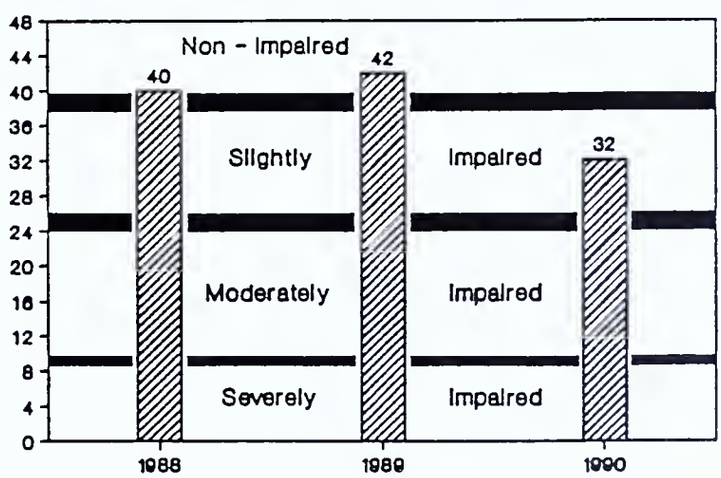


TABLE 14.--Water quality summary Cayuta Creek at Waverly, N.Y.

Parameters Exceeding Standards

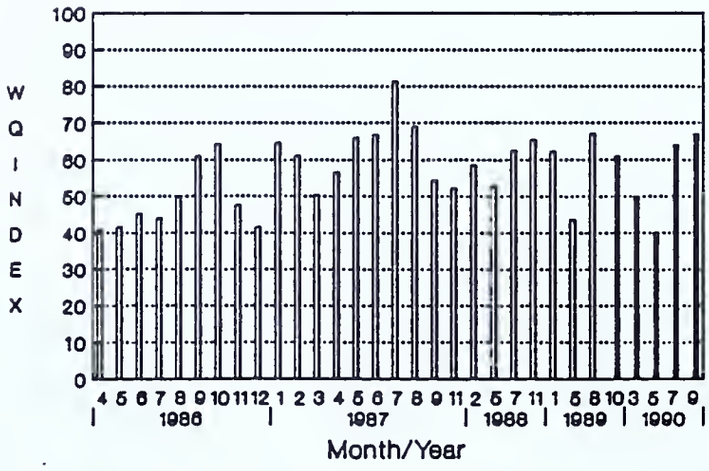
Parameter	Date	Value	Standard	State
pH	10/30/89	8.7	8.5	N.Y. and Pa.

Date	WQ Index	Parameters Exceeding 90th Percentile
10/30/89	61	TP DP DPO4 TPO4
03/06/90	50	DNO3 DPO4 TC1 TPO4
05/15/90	40	
07/25/90	64	DNH3 TNH3 DNO2 TNO2
09/12/90	67	COND ALK TS DS DNO3 TNO3 TP DP DPO4 TC1 TSO4 TPO4

Biological Summary

Number of taxa:	16
Diversity index:	1.64
RBP Score:	20
RBP Condition:	Moderately impaired

Water Quality Index



Biological Index

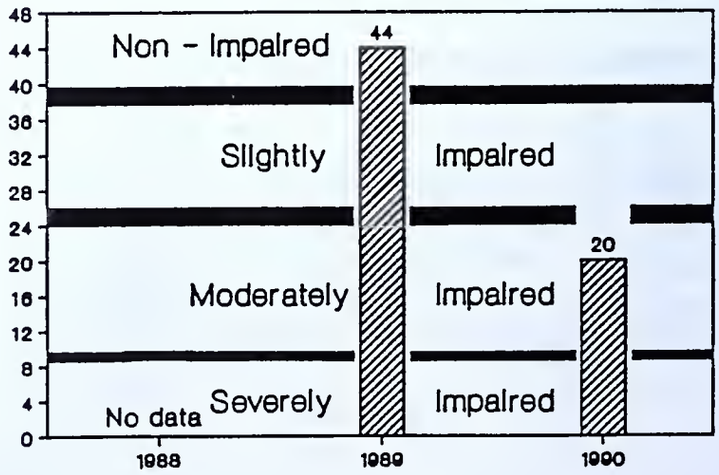


TABLE 15.--Water quality summary North Fork Cowanesque River at North Fork, Pa.

Parameters Exceeding Standards

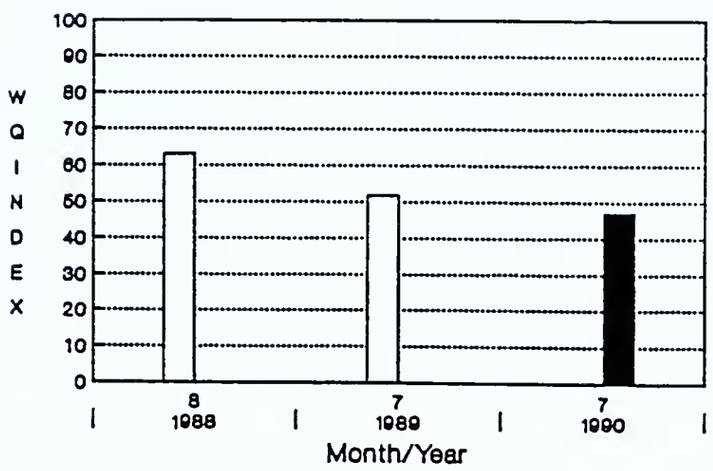
Parameter	Date	Value	Standard	State
None				

Date	WQ Index	Parameters Exceeding 90th Percentile
07/26/90	47	DNO3 TNO3

Biological Summary

Number of taxa:	17
Diversity index:	2.56
RBP Score:	32
RBP Condition:	Slightly impaired

Water Quality Index



Biological Index

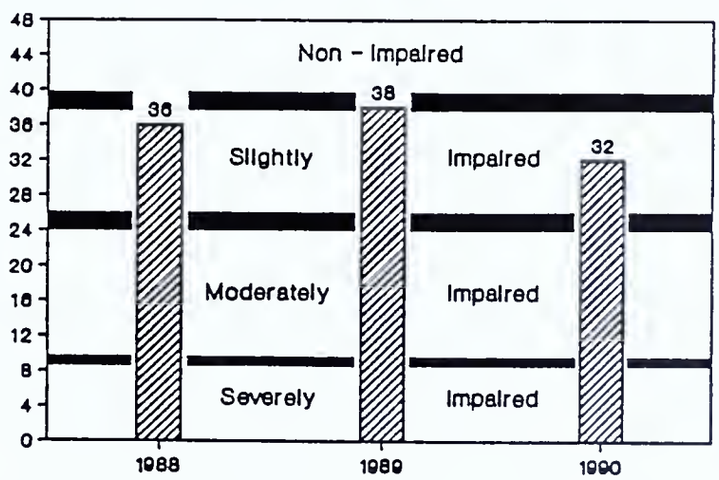


TABLE 16.--Water quality summary Troups Creek at Austinburg, Pa.

Parameters Exceeding Standards

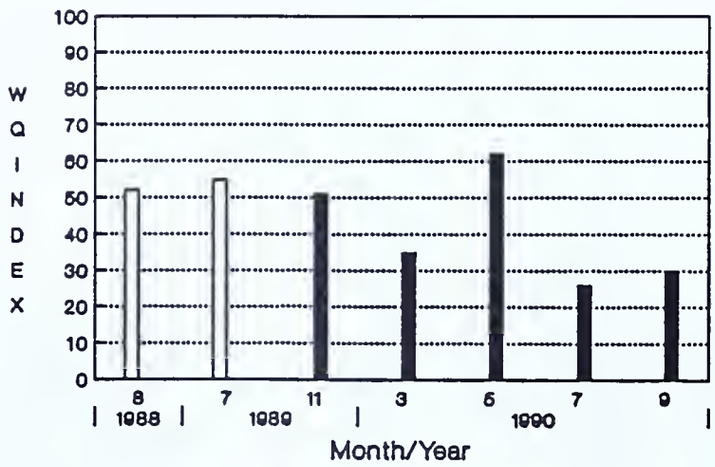
Parameter	Date	Value	Standard	State
TFe	05/16/90	6,020 ug/l	1,500 ug/l	Pa. chronic fish
TAl	"	4,470 ug/l	500 ug/l	N.Y. and Pa. chronic fish

Date	WQ Index	Parameters Exceeding 90th Percentile
10/31/89	51	
03/07/90	35	
05/16/90	62	TS TOC TFe TAl DAl TURB
07/26/90	26	ALK
09/13/90	30	ALK

Biological Summary

Number of taxa:	15
Diversity index:	1.92
RBP Score:	14
RBP Condition:	Moderately impaired

Water Quality Index



Biological Index

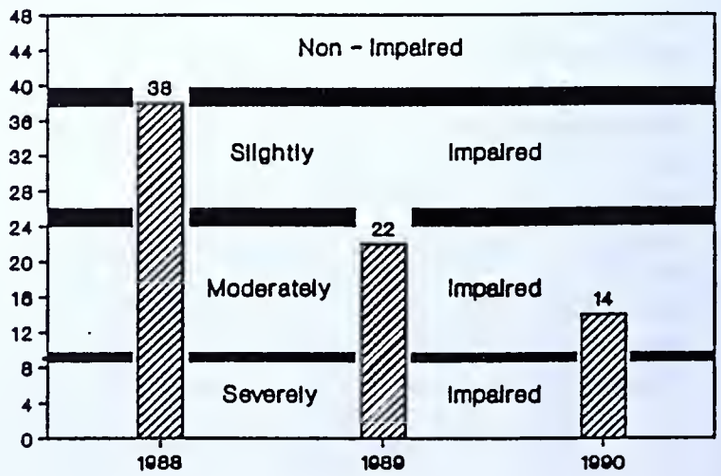


TABLE 17.--Water quality summary Holden Creek at Woodhull, N.Y.

Parameters Exceeding Standards

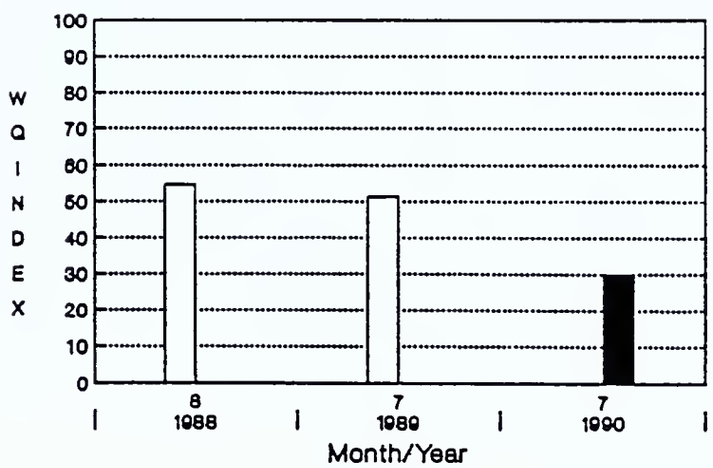
Parameter	Date	Value	Standard	State
None				

Date	WQ Index	Parameters Exceeding 90th Percentile
07/25/90	30	ALK TMg

Biological Summary

Number of taxa:	16
Diversity index:	2.53
RBP Score:	28
RBP Condition:	Slightly impaired

Water Quality Index



Biological Index

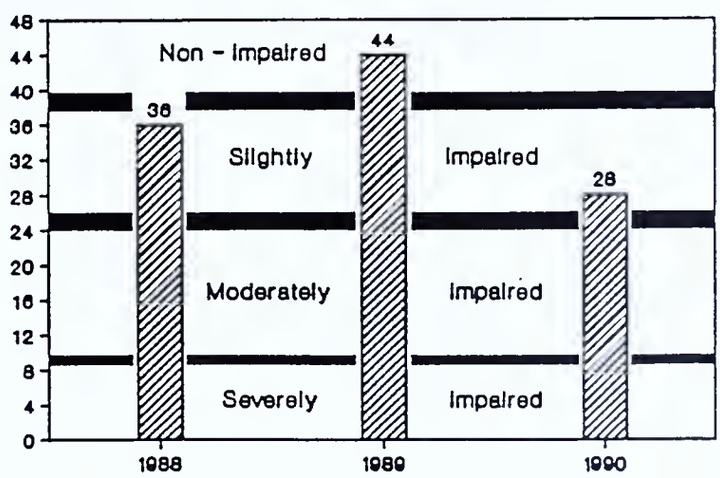


TABLE 18.--Water quality summary Cowanesque River at Lawrenceville, Pa.

Parameters Exceeding Standards

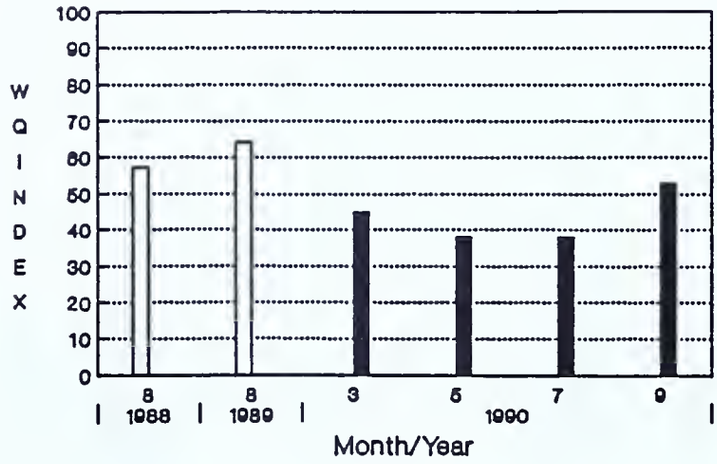
Parameter	Date	Value	Standard	State
None				

Date	WQ Index	Parameters Exceeding 90th Percentile
03/07/90	45	
05/16/90	38	TOC
07/24/90	38	
09/13/90	53	DNH3 TNH3 TURB

Biological Summary

Number of taxa:	11
Diversity index:	1.98
RBP Score:	10
RBP Condition:	Severely impaired

Water Quality Index



Biological Index

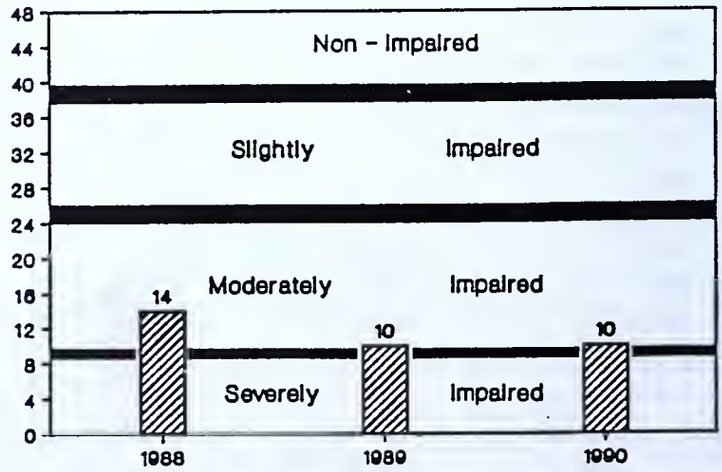


TABLE 19.--Water quality summary Tioga River Lindley, N.Y.

Parameters Exceeding Standards

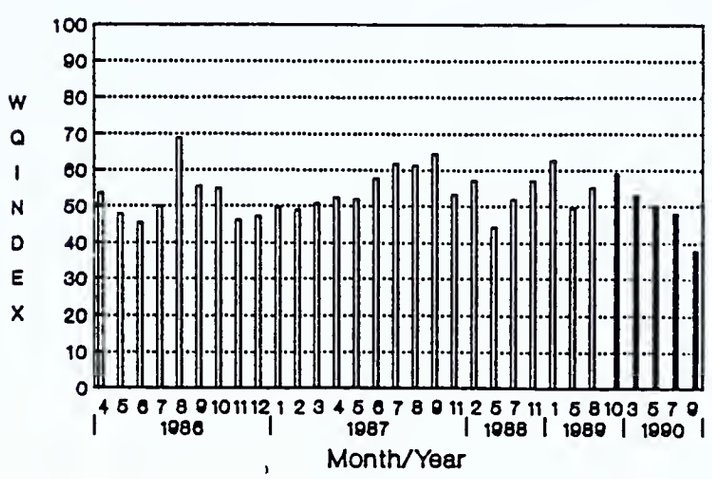
Parameter	Date	Value	Standard	State
TMn	10/31/89	650 ug/l	300 ug/l	N.Y. chronic fish
DMn	"	620 ug/l	300 ug/l	N.Y. chronic fish
TMn	03/07/90	668 ug/l	300 ug/l	N.Y. chronic fish
DMn	"	623 ug/l	300 ug/l	N.Y. chronic fish
TMn	05/16/90	608 ug/l	300 ug/l	N.Y. chronic fish
DMn	"	529 ug/l	300 ug/l	N.Y. chronic fish
TMn	09/13/90	543 ug/l	300 ug/l	N.Y. chronic fish
DMn	"	439 ug/l	300 ug/l	N.Y. chronic fish

Date	WQ Index	Parameters Exceeding 90th Percentile
10/31/90	59	BOD TMg TSO4 TMn DMn
03/07/90	53	DNH3 TNH3 TNO3
05/16/90	50	TSO4 TMn DMn DAl TMn DMn
07/24/90	48	BOD
09/13/90	38	BOD TSO4 TMn DMn

Biological Summary

Number of taxa:	8
Diversity index:	2.02
RBP Score:	18
RBP Condition:	Moderately impaired

Water Quality Index



Biological Index

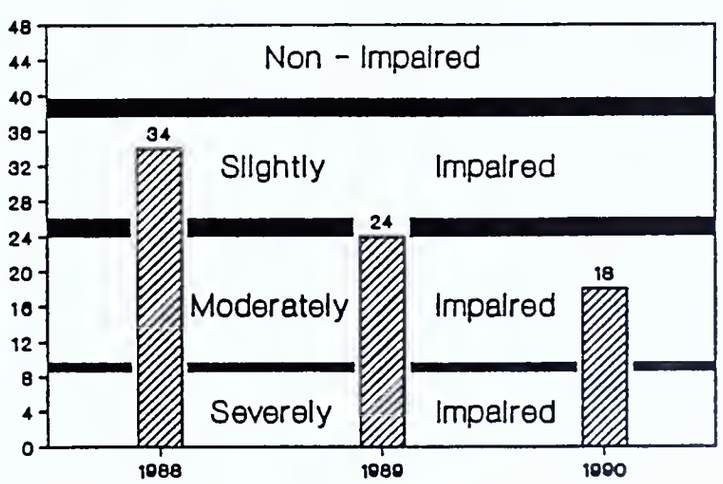


TABLE 20.--Water quality summary Seeley Creek at Seeley Creek, N.Y.

Parameters Exceeding Standards

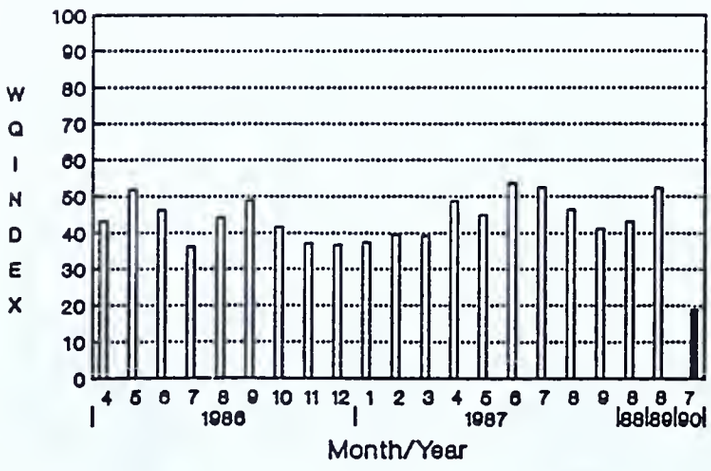
Parameter	Date	Value	Standard	State
None				

Date	WQ Index	Parameters Exceeding 90th Percentile
07/25/90	19	

Biological Summary

Number of taxa:	17
Diversity index:	2.19
RBP Score:	22
RBP Condition:	Moderately impaired

Water Quality Index



Biological Index

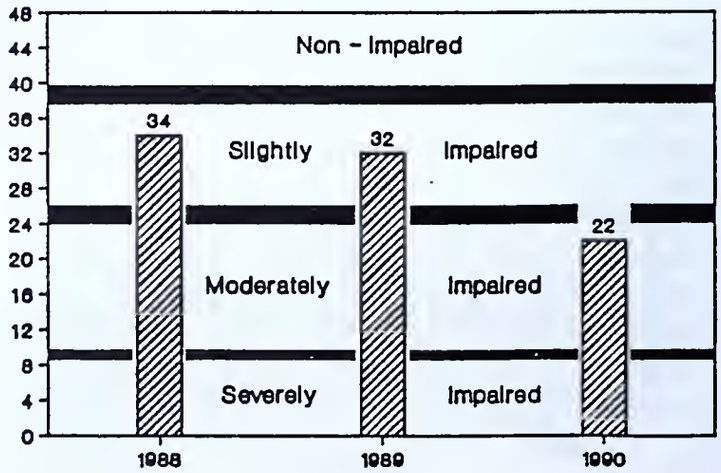


TABLE 21.--Water quality summary South Creek at Fassett, Pa.

Parameters Exceeding Standards

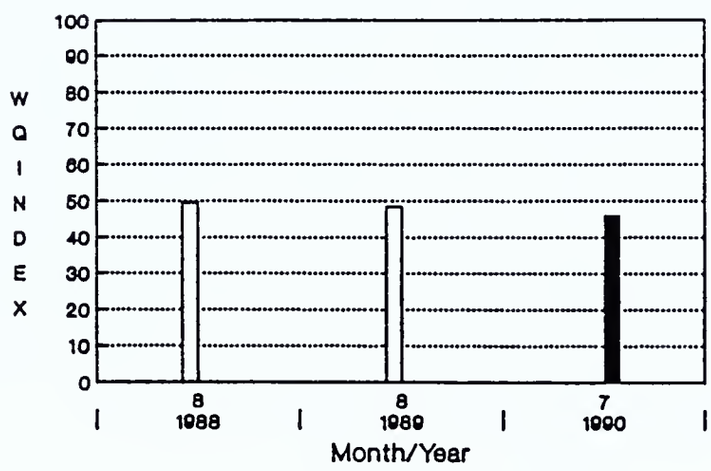
Parameter	Date	Value	Standard	State
TFe	07/25/90	1,680 ug/l	1,500 ug/l	Pa. chronic fish
DFe	"	436 ug/l	300 ug/l	N.Y. and Pa. chronic human health and N.Y. chronic fish
TAl	07/25/90	639 ug/l	500 ug/l	N.Y. and Pa. chronic fish

Date	WQ Index	Parameters Exceeding 90th Percentile
07/25/90	46	TOC TFe DFe TAL TURB

Biological Summary

Number of taxa:	16
Diversity index:	2.55
RBP Score:	30
RBP Condition:	Slightly impaired

Water Quality Index



Biological Index

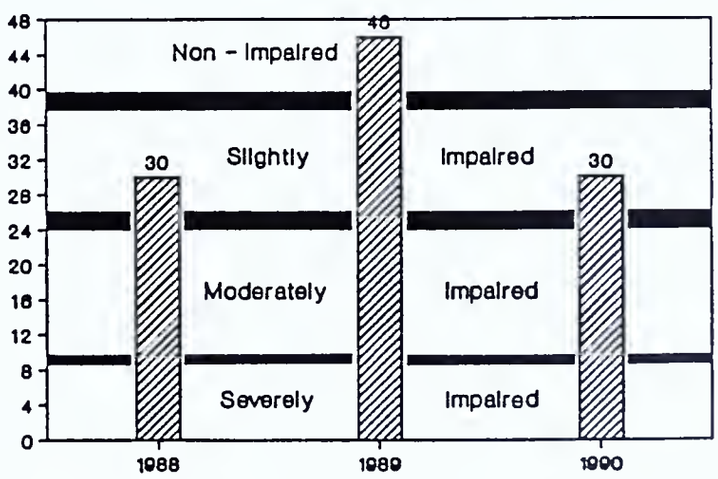


TABLE 22.--Water quality summary Bentley Creek at Wellsburg, N.Y.

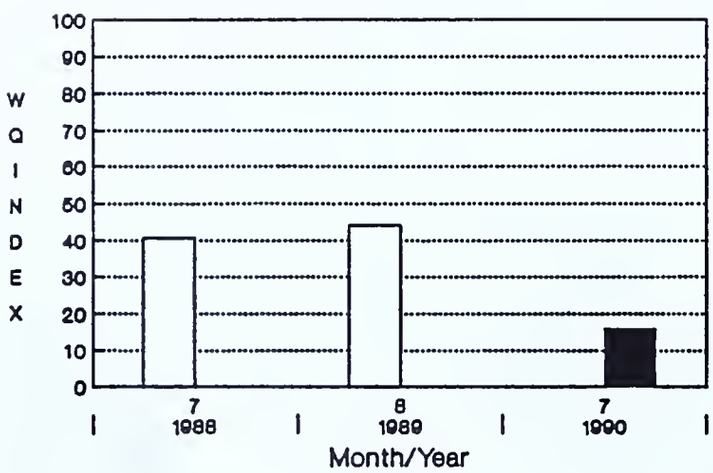
Parameters Exceeding Standards				
Parameter	Date	Value	Standard	State
None				

Date	WQ Index	Parameters Exceeding 90th Percentile
07/25/90	16	

Biological Summary

Number of taxa:	18
Diversity index:	2.45
RBP Score:	30
RBP Condition:	Slightly impaired

Water Quality Index



Biological Index

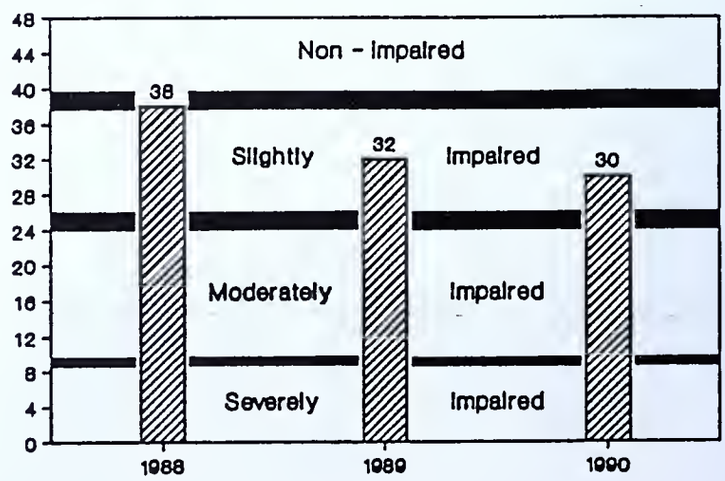


TABLE 23.--Water quality summary Chemung River at Chemung, N.Y.

Parameters Exceeding Standards

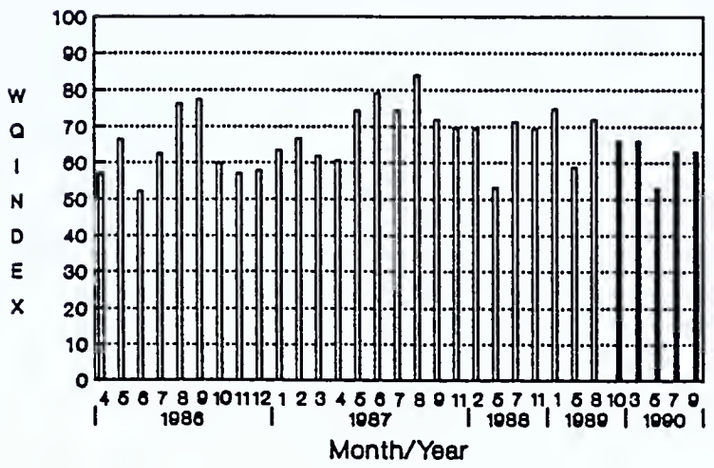
Parameter	Date	Value	Standard	State
pH	10/30/89	8.6	8.5	N.Y. and Pa.

Date	WQ Index	Parameters Exceeding 90th Percentile
10/30/89	66	COND TS DS DPO4 TMg TCl
03/06/90	66	COND DNH3 TNH3 DNO3 TNO3 TCl
05/15/90	53	TMg
07/25/90	63	
09/12/90	63	COND BOD TS DS TMg TSO4

Biological Summary

Number of taxa:	19
Diversity index:	2.50
RBP Score:	28
RBP Condition:	Slightly impaired

Water Quality Index



Biological Index

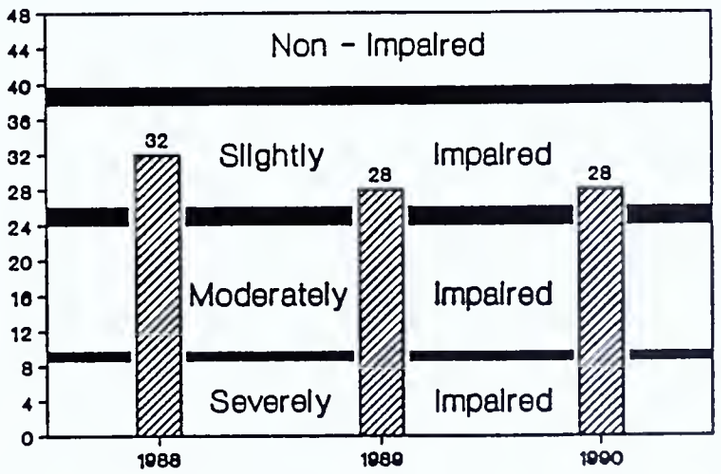


TABLE 24.--Water quality summary Susquehanna River at Sayre, Pa.

Parameters Exceeding Standards

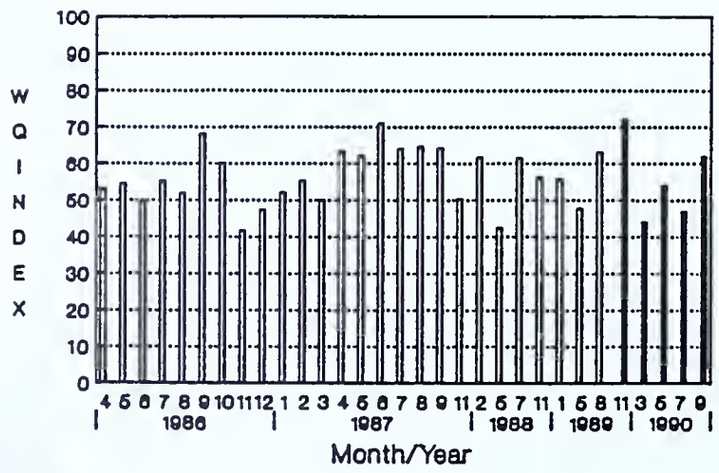
Parameter	Date	Value	Standard	State
TFE	05/15/90	1930 ug/l	1500 ug/l	Pa. chronic fish
TA1	05/15/90	1180 ug/l	500 ug/l	N.Y. and Pa. chronic fish

Date	WQ Index	Parameters Exceeding 90th Percentile
10/30/90	72	TP DP DPO4 TPO4
03/06/90	44	DNH3 TNH3 DNO3 TNO3
05/15/90	54	TFe TA1 TURB
07/24/90	47	
09/12/90	62	COND ALK DNO2 TNO2 TC1

Biological Summary

Number of taxa:	21
Diversity index:	2.60
RBP Score:	38
RBP Condition:	Non-impaired

Water Quality Index



Biological Index

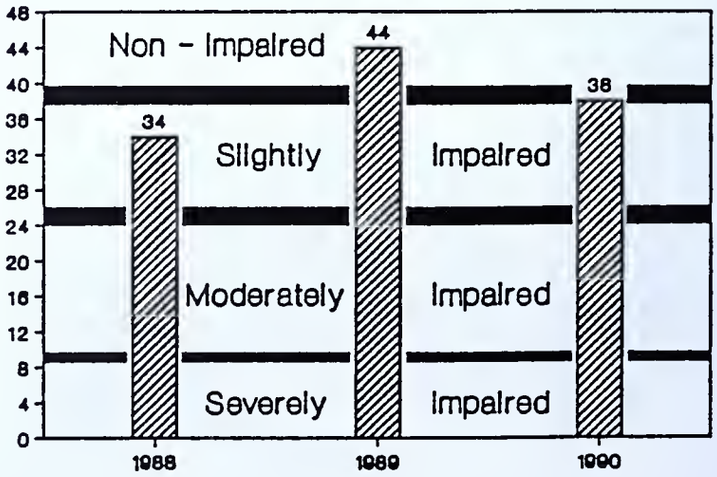


TABLE 25.--Water quality summary South Branch Conewago Creek at Bandanna, Pa.

Parameters Exceeding Standards

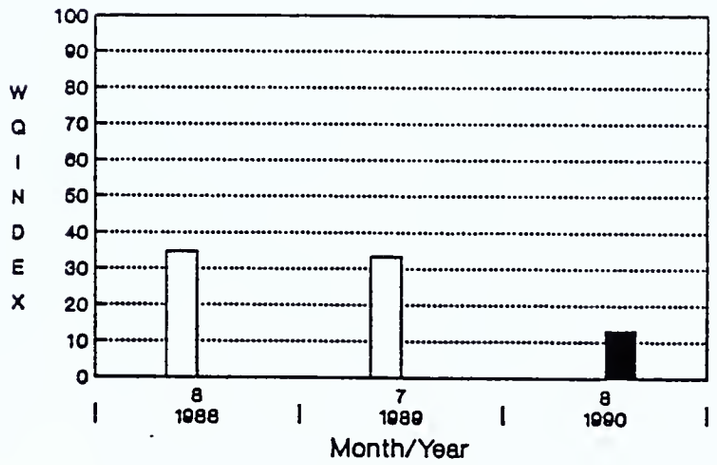
Parameter	Date	Value	Standard	State
None				

Date	WQ Index	Parameters Exceeding 90th Percentile
07/30/90	13	

Biological Summary

Number of taxa:	20
Diversity index:	2.68
RBP Score:	46
RBP Condition:	Reference

Water Quality Index



Biological Index

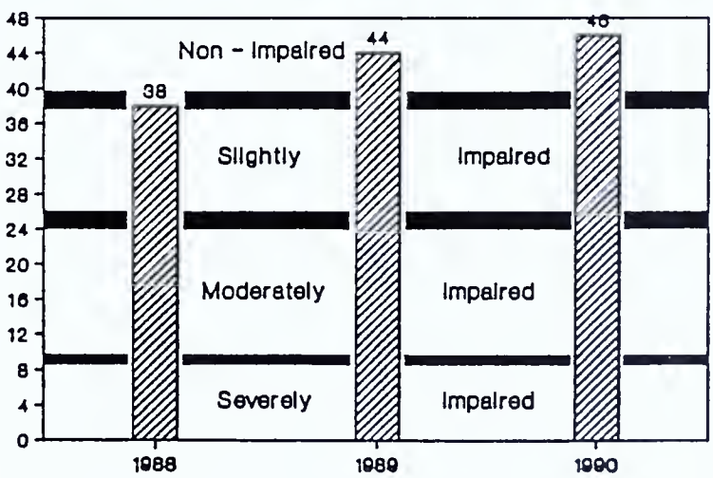


TABLE 26.--Water quality summary Long Arm Creek at Bandanna, Pa.

Parameters Exceeding Standards

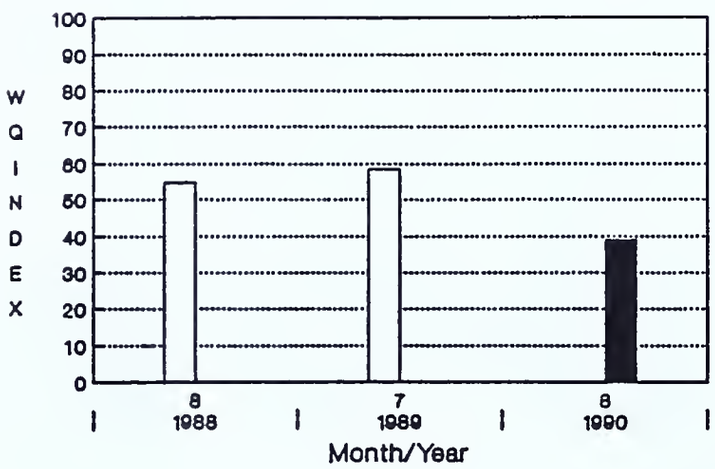
Parameter	Date	Value	Standard	State
TA1	07/30/90	561 ug/1	500 ug/1	Pa. chronic fish

Date	WQ Index	Parameters Exceeding 90th Percentile
07/30/90	39	

Biological Summary

Number of taxa:	19
Diversity index:	2.31
RBP Score:	42
RBP Condition:	Non-impaired

Water Quality Index



Biological Index

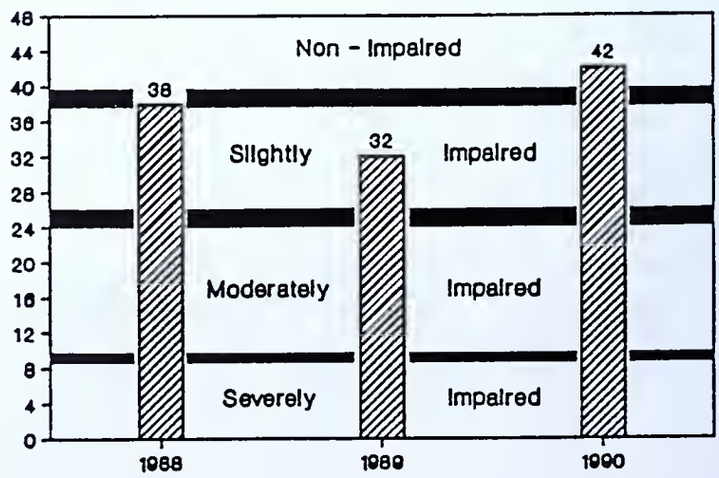


TABLE 27.--Water quality summary Susquehanna River at Marietta, Pa.

Parameters Exceeding Standards

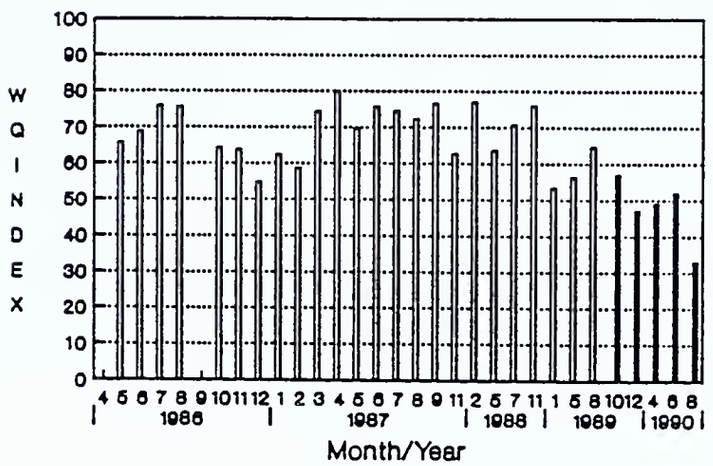
Parameter	Date	Value	Standard	State
pH	10/03/89	8.7	8.5	Md. and Pa.
TAl	"	750 ug/l	500 ug/l	Pa. chronic fish
TFe	04/17/90	1,770 ug/l	1,500 ug/l	Pa. chronic fish
TAl	"	890 ug/l	500 ug/l	Pa. chronic fish
TAl	"	"	750 ug/l	Md. chronic fish
DFe	06/13/90	990 ug/l	300 ug/l	Pa. chronic human health
TAl	"	1,290 ug/l	500 ug/l	Pa. chronic fish
TAl	"	"	750 ug/l	Md. chronic fish
DAl	"	"	500 ug/l	Pa. chronic fish
DAl	"	"	750 ug/l	Md. chronic fish

Date	WQ Index	Parameters Exceeding 90th Percentile
10/03/89	57	COND TSO4
12/13/89	47	TSO4
04/17/90	49	TS DS
06/13/90	52	DFe TAl DAl
08/02/90	33	TSO4

Biological Summary

Number of taxa:	17
Diversity index:	2.18
RBP Score:	26
RBP Condition:	Slightly impaired

Water Quality Index



Biological Index

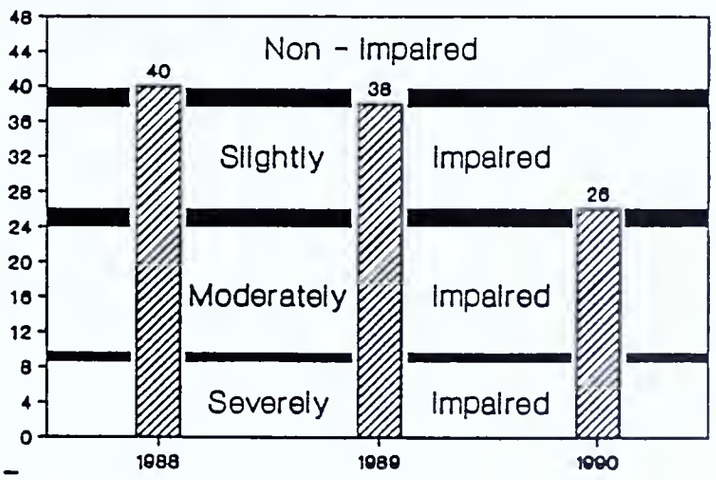


TABLE 28.--Water quality summary Scott Creek at Delta, Pa.

Parameters Exceeding Standards

Parameter	Date	Value	Standard	State
TFe	10/02/89	3,520 ug/l	1,500 ug/l	Pa. chronic fish
DFe	"	1,090 ug/l	300 ug/l	Pa. chronic human health
TAl	"	1,030 ug/l	500 ug/l	Pa. chronic fish
TAl	"	"	750 ug/l	Md. chronic fish
pH	12/06/89	6.4	6.5	Md.
TFe	04/18/90	3,600 ug/l	1,500 ug/l	Pa. chronic fish
DFe	"	2,050 ug/l	300 ug/l	Pa. chronic human health
TMn	"	1,640 ug/l	1,000 ug/l	Pa. chronic fish
DMn	"	1,520 ug/l	1,000 ug/l	Pa. chronic fish
DO	06/12/90	4.3 mg/l	5.0 mg/l	Md. and Pa.
TMn	"	1,090 ug/l	1,000 ug/l	Pa. chronic fish
DMn	"	1,080 ug/l	1,000 ug/l	Pa. chronic fish

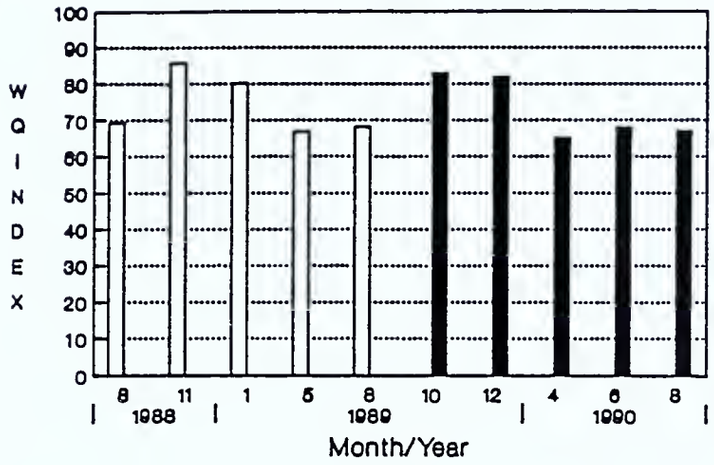
Date	WQ Index	Parameters Exceeding 90th Percentile
10/02/89	83	DO BOD DNO2 TNO2 DKN TKN TP DP DPO4 TOC TMg TFe DFe TMn DMn TPO4 TURB
12/06/89	82	COND BOD ALK TS DS DNH3 TNH3 TNO2 DKN TKN TP DP TOC TMg TCl TFe DFe TMn DMn
04/18/90	65	TMg
06/12/90	68	DO BOD DNO2 DKN TKN TP TOC TCL TMn DMn TPO4
08/01/90	67	DO DNH3 TNH3 DNO2 TNO2 DPO4 DMn

Biological Summary

Number of taxa:	9
Diversity index:	1.83
RBP Score:	10
RBP Condition:	Severely impaired

TABLE 28.--Water quality summary Scott Creek at Delta, Pa.--Continued

Water Quality Index



Biological Index

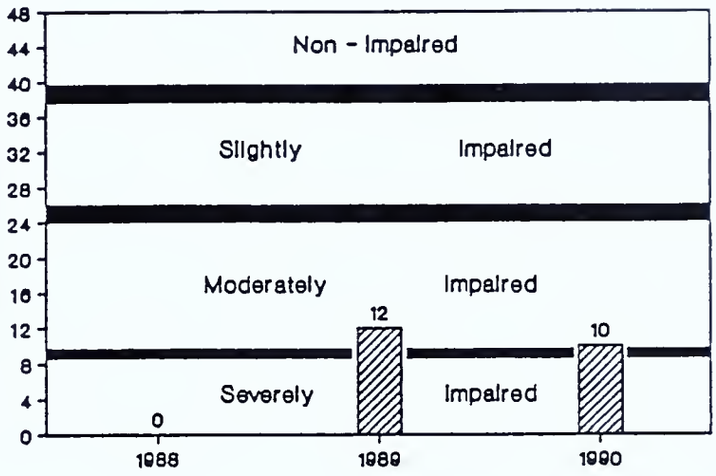


TABLE 29.--Water quality summary Conowingo Creek at Pleasant Grove, Pa.

Parameters Exceeding Standards

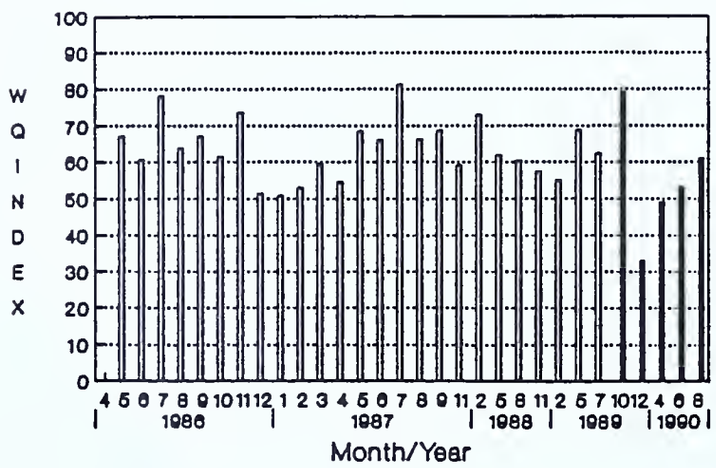
Parameter	Date	Value	Standard	State
TFE	10/03/89	1,670 ug/1	1,500 ug/1	Pa. chronic fish
TAl	"	1,360 ug/1	750 ug/1	Md. chronic fish
TAl	"	"	500 ug/1	Pa. chronic fish
DFe	12/07/89	620 ug/1	300 ug/1	Pa. chronic human health
TAl	06/12/90	680 ug/1	500 ug/1	Pa. chronic fish

Date	WQ Index	Parameters Exceeding 90th Percentile
10/03/89	79	DNH3 TNH3 DNO2 TNO2 DKN TKN TP DP DPO4 TOC TAl TPO4 TURB
12/07/89	33	DNO3 TNO3
04/18/90	49	DNO3 TNO3
06/12/90	53	DNO3 TNO3
08/02/90	61	DNO3 TNO3

Biological Summary

Number of taxa:	19
Diversity index:	2.52
RBP Score:	36
RBP Condition:	Slightly impaired

Water Quality Index



Biological Index

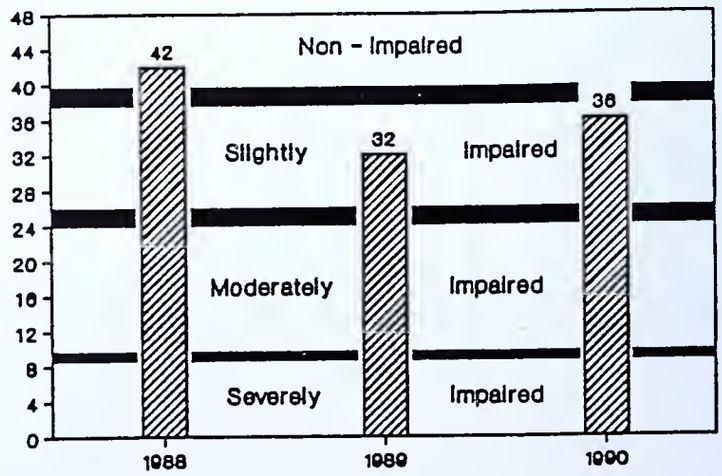


TABLE 30.--Water quality summary Octoraro Creek at Rising Sun, Md.

Parameters Exceeding Standards

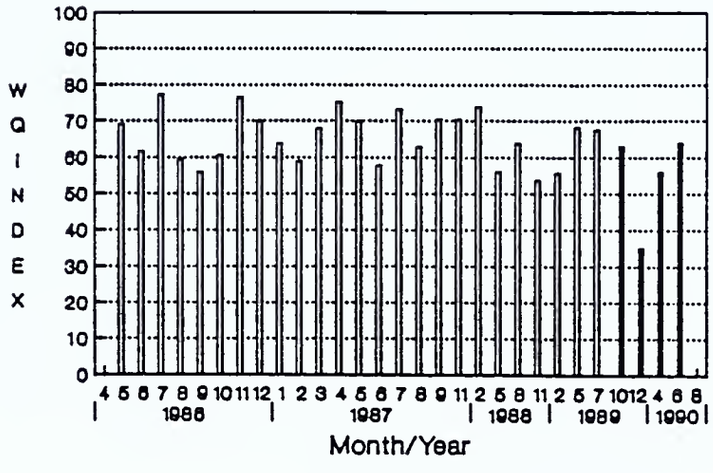
Parameter	Date	Value	Standard	State
DFe	06/12/90	400 ug/1	300 ug/1	Pa. chronic human health
TA1	"	820 ug/1	500 ug/1	Pa. chronic fish
TA1	"	"	750 ug/1	Md. chronic fish
DA1	"	760 ug/1	500 ug/1	Pa. chronic fish
DA1	"	"	750 ug/1	Md. chronic fish

Date	WQ Index	Parameters Exceeding 90th Percentile
10/03/89	63	DP DP04 TP04
12/07/89	35	
04/18/90	56	DA1
06/12/90	64	DA1

Biological Summary

Number of taxa:	17
Diversity index:	2.25
RBP Score:	34
RBP Condition:	Slightly impaired

Water Quality Index



Biological Index

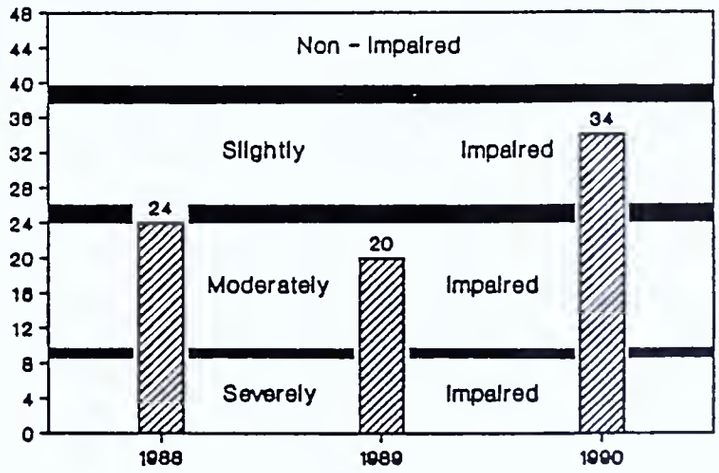


TABLE 31.--Water quality summary Ebaughs Creek at Stewartstown, Pa.

Parameters Exceeding Standards

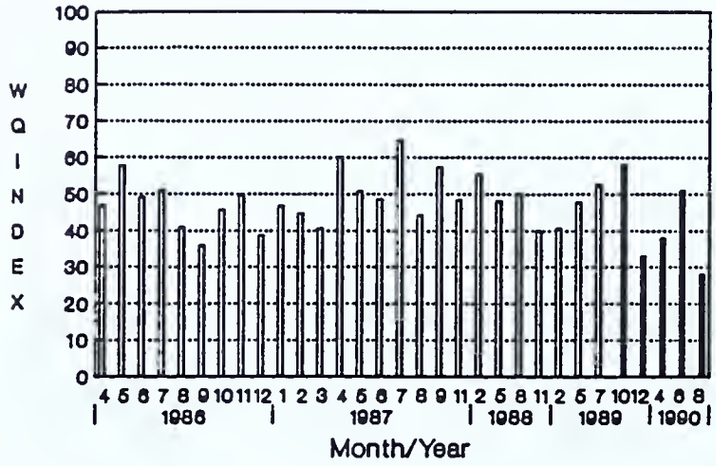
Parameter	Date	Value	Standard	State
TFe	10/02/89	1,780 ug/l	1,500 ug/l	Pa. chronic fish
TAl	"	930 ug/l	500 ug/l	Pa. chronic fish
TAl	"	"	750 ug/l	Md. chronic fish
DFe	12/06/89	350 ug/l	300 ug/l	Pa. chronic human health

Date	WQ Index	Parameters Exceeding 90th Percentile
10/02/89	58	DNH3 TNH3 TFe
12/06/89	33	
04/18/90	38	
06/18/90	51	TCl
07/30/90	28	

Biological Summary

Number of taxa:	16
Diversity index:	2.22
RBP Score:	34
RBP Condition:	Slightly impaired

Water Quality Index



Biological Index

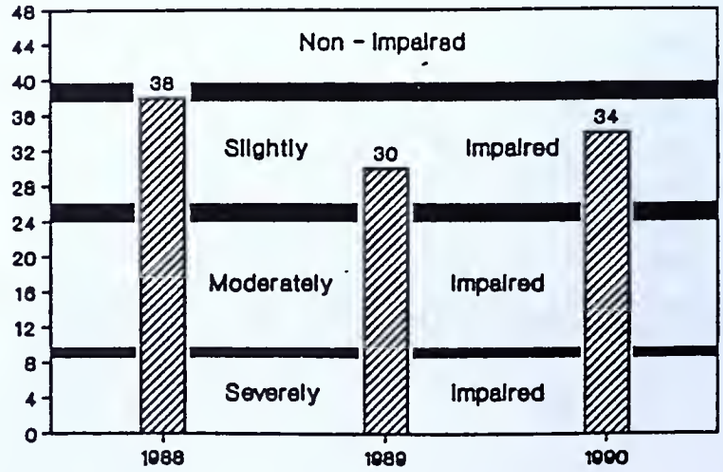


TABLE 32.--Water quality summary Deer Creek at Gorsuch Mills, Md.

Parameters Exceeding Standards

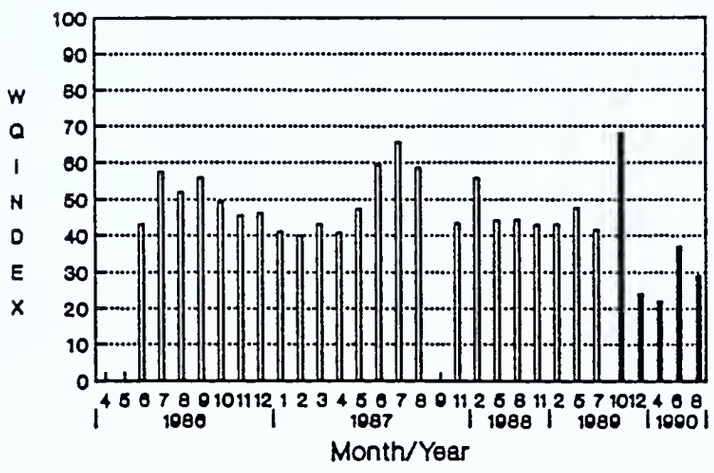
Parameter	Date	Value	Standard	State
TFe	10/02/89	2,630 ug/l	1,500 ug/l	Pa. chronic fish
DFe	"	890 ug/l	300 ug/l	Pa. chronic human health
TAl	"	1,610 ug/l	750 ug/l	Md. chronic fish
Dal	"	"	500 ug/l	Pa. chronic fish

Date	WQ Index	Parameters Exceeding 90th Percentile
10/02/89	68	TFe DFe TAl TURB
12/06/89	24	
04/18/90	22	
06/18/90	37	
07/31/90	29	

Biological Summary

Number of taxa:	16
Diversity index:	2.28
RBP Score:	28
RBP Condition:	Slightly impaired

Water Quality Index



Biological Index

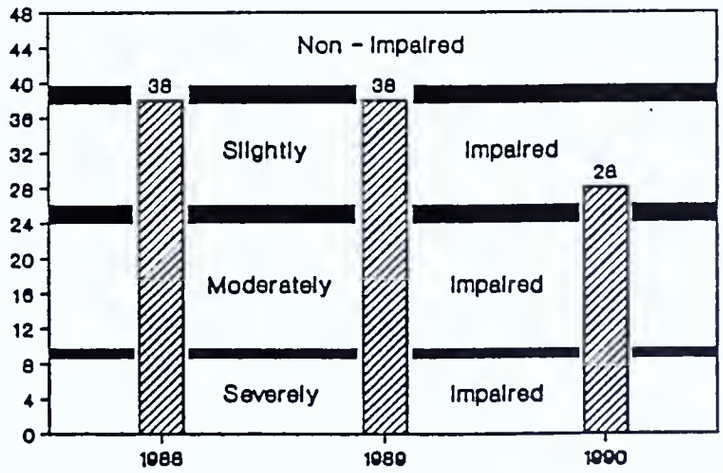


TABLE 33.--Water quality summary Big Branch Deer Creek at Fawn Grove, Pa.

Parameters Exceeding Standards

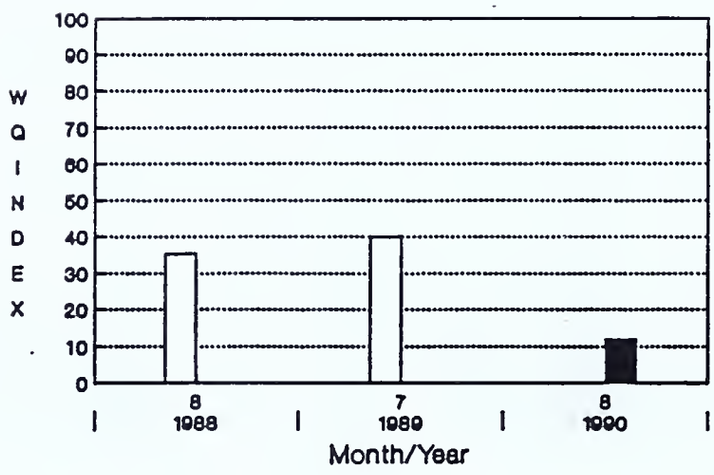
Parameter	Date	Value	Standard	State
None				

Date	WQ Index	Parameters Exceeding 90th Percentile
07/31/90	12	

Biological Summary

Number of taxa:	15
Diversity index:	2.22
RBP Score:	32
RBP Condition:	Slightly impaired

Water Quality Index



Biological Index

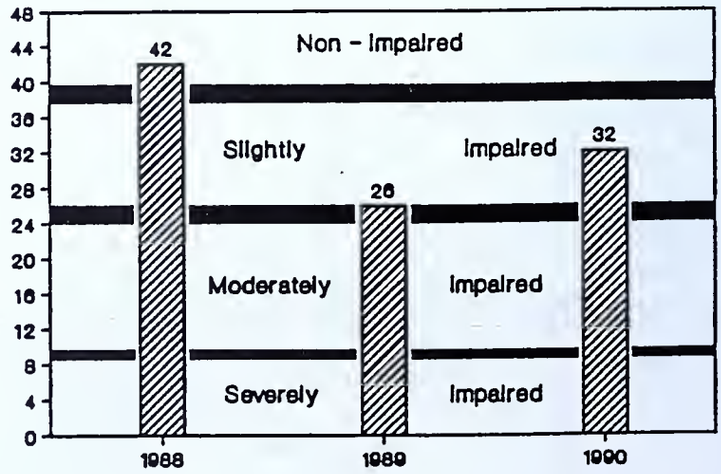


TABLE 34.--Water quality summary Falling Branch Deer Creek at Fawn Grove, Pa.

Parameters Exceeding Standards

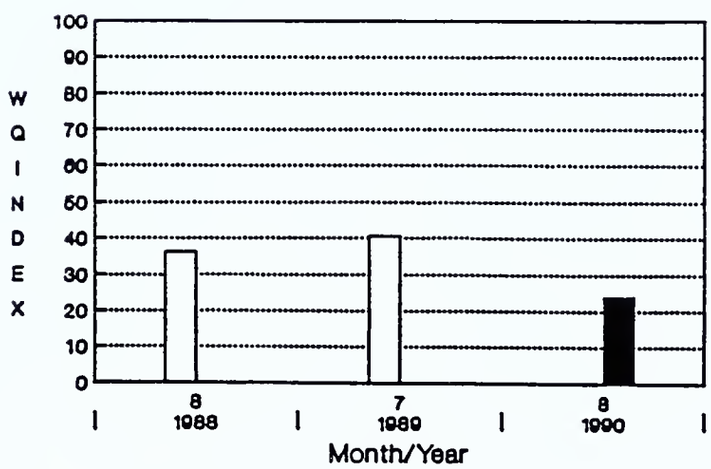
Parameter	Date	Value	Standard	State
None				

Date	WQ Index	Parameters Exceeding 90th Percentile
07/31/90	24	

Biological Summary

Number of taxa:	17
Diversity index:	2.27
RBP Score:	28
RBP Condition:	Slightly impaired

Water Quality Index



Biological Index

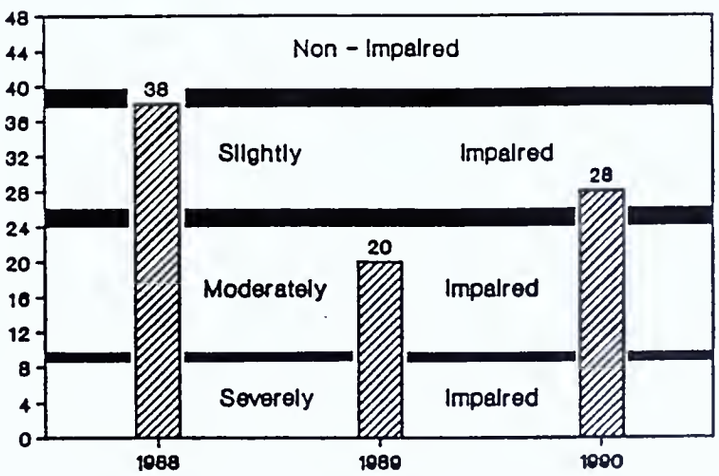


TABLE 35.--Water quality summary Susquehanna River at Conowingo, Md.

Parameters Exceeding Standards

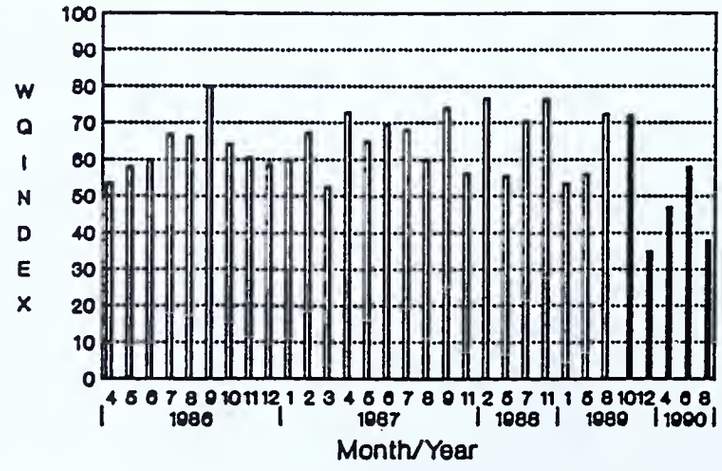
Parameter	Date	Value	Standard	State
TA1	10/03/89	1,160 ug/1	500 ug/1	Pa. chronic fish
TA1	"	"	750 ug/1	Md. chronic fish
TA1	04/17/90	683 ug/1	500 ug/1	Pa. chronic fish

Date	WQ Index	Parameters Exceeding 90th Percentile
10/03/89	72	COND DO TMg TSO4 TMn TA1
12/07/89	35	
04/17/90	47	TS DS
06/13/90	58	DFe TA1 DA1
08/01/90	38	TSO4

Biological Summary

Number of taxa: None
Diversity index:
RBP Score:
RBP Condition:

Water Quality Index



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APPENDIX A.—DATA FOR GROUP 1 STATIONS

TABLE A1.--Macroinvertebrate data for Susquehanna River at Windsor, N.Y.

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Gonielmis *	
		Macronychus *	
		Optioservus *	
		Stenelmis	7
	Gyrinidae	Dineutis	1
	Psephenidae	Psephenus	5
Diptera	Athericidae	Atherix *	
	Chironomidae	.....	5
	Simuliidae	Simulium *	
	Tipulidae	Antocha *	
Ephemeroptera	Baetidae	Baetis *	
		Centroptilum *	
		Neocloeon	2
		Pseudocloeon.....	1
	Caenidae	Caenis	1
	Ephemerellidae	Ephemerella	1
		Serratella *	
	Heptageniidae	Heptagenia *	
		Rhithrogena *	
		Stenacron *	
		Stenonema	5
	Oligoneuriidae	Isonychia	21
	Polymitarcyidae	Ephoron	23
	Potamanthidae	Potamanthus	1
Megaloptera	Corydalidae	Corydalus	2
	Sialidae	Sialis *	
Plecoptera	Perlidae	Acroneuria *	
		Neoperla *	
		Paragnetina *	
		Phasganophora	4
	Perlodidae	Isoperla *	
Trichoptera	Hydropsychidae	Cheumatopsyche *	
		Hydropsyche *	
		Macronemum	13
		Symphitopsyche	15
	Hydroptilidae	Stactobiella *	
	Lepidostomatidae	Theliopsyche *	
	Leptoceridae	Mystacides	1
	Limnephilidae	Frenesia *	
	Philopotamidae	Chimarra	7
	Polycentropodidae	Neureclipsis *	
		Nyctiophylax *	
Amphipoda	Gammaridae	Gammarus *	
Decapoda	Cambaridae	Cambarus *	

TABLE A1.--Macroinvertebrate data for Susquehanna River at Windsor, N.Y.--Continued

Order	Family	Genus	Individuals Collected
Limnophila	Physidae	Physa	1
Tricladida	Planariidae	Dugesia *	

* Taxa not collected in 1990

NUMBER OF TAXA: 1986-90: 46
1990: 19

RBP SCORE: 30
DIVERSITY INDEX: 2.30

TABLE A2.--Water quality data for Susquehanna River at Windsor, N.Y.

Parameter	Units	10/30/89 1115	03/06/90 1210	05/15/90 1145	07/23/90 1425	09/12/90 1110
Discharge	cfs	2,150	3,351	9,521	--	--
Temperature	Celsius	12	2	14	22	21.5
Conductivity	umhos/cm	165	255	112	220	220
Dissolved Oxygen	mg/l	10.3	13.4	10.2	8	9.1
Biochemical Oxygen Demand	mg/l	0.8	0.4	0.8	0.4	0.4
pH		7.9	7.6	8.2	8.3	7.4
Alkalinity	mg/l	46	46	38	67	76
Acidity	mg/l	10	4	--	0	--
Solids - Dissolved	mg/l	114	132	38	166	132
Total	mg/l	120	134	96	176	140
Ammonia as N - Dissolved	mg/l	0.02	0.03	0.01	0.02	0.02
Total	mg/l	0.02	0.03	0.02	0.02	0.02
Nitrite as N - Dissolved	mg/l	0.004	0.004	0.01	0.01	0.01
Total	mg/l	0.004	0.004	0.01	0.01	0.01
Nitrate as N - Dissolved	mg/l	0.79	1.08	0.87	0.57	0.61
Total	mg/l	0.79	1.08	0.9	0.58	0.61
Kjeldahl as N - Dissolved	mg/l	1	0.2	0.32	0.3	0.2
- Total	mg/l	1	0.3	0.44	0.32	0.2
Phosphorus - Dissolved	mg/l	0.06	0.02	0.03	0.03	0.03
Total	mg/l	0.1	0.03	0.07	0.05	0.05
Orthophosphate as P - Dissolved	mg/l	0.032	0.004	0.003	0.004	0.007
Total	mg/l	0.041	0.01	0.026	0.01	0.018
Total Organic Carbon	mg/l	3.1	1.9	3.6	2.6	1
Magnesium - Total	mg/l	2.87	2.71	1.97	3.33	3.52
Chloride - Total	mg/l	8	10	7	11	11
Sulfate - Total	mg/l	21	13	31	14	23
Turbidity	NTU	5.6	5.3	12.3	4.5	2.5
Iron - Dissolved	ug/l	290	78	69	10	25
Total	ug/l	550	328	1,270	177	199
Manganese - Dissolved	ug/l	50	33	10	14	24
Total	ug/l	60	48	65	43	50
Alumimum - Dissolved	ug/l	150	173	135	135	135
Total	ug/l	150	382	851*	135	135
WATER QUALITY INDEX		53	43	46	39	36

* Values exceed water quality standards.

TABLE A3.--Macroinvertebrate data for Susquehanna River at Kirkwood, N.Y.

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Ancyronyx *	
		Dubiraphia *	
		Macronychus *	
		Optioservus *	
		Stenelmis	6
	Hydrophilidae	Berosus *	
	Psephenidae	Psephenus	6
	Ptilodactylidae	Anchytarsus *	
Diptera	Athericidae	Atherix *	
	Chironomidae	.....	5
	Tipulidae	Antocha *	
		Tipula *	
Ephemeroptera	Baetidae	Baetis *	
		Centroptilum *	
		Pseudocloeon *	
	Caenidae	Brachycercus *	
	Ephemerellidae	Serratella *	
	Heptageniidae	Heptagenia *	
		Stenacron *	
		Stenonema	18
	Leptophlebiidae	Paraleptophlebia *	
	Oligoneuriidae	Isonychia	1
	Polymitarcyidae	Ephoron	21
	Potamanthidae	Potamanthus	25
	Tricorythidae	Tricorythodes	1
Lepidoptera	Pyralidae	Petrophila *	
Megaloptera	Corydalidae	Corydalus *	
Odonata	Coenagrionidae	Argia *	
Plecoptera	Perlidae	Neoperla *	
		Phasganophora	3
Trichoptera	Brachycentridae	Brachycentrus	2
	Glossosomatidae	Glossosoma	7
	Helicopsychidae	Helicopsyche *	
	Hydropsychidae	Cheumatopsyche	1
		Hydropsyche *	
		Macronemum	1
		Symphitopsyche	6
	Hydroptilidae	Stactobiella *	
	Lepidostomatidae	Lepidostoma *	
		Theliopsyche *	
	Limnephilidae	Hydatophylax	2
		Pycnopsyche	3
	Philopotamidae	Chimarra	2
Hydracarina		.....	1

TABLE A3.--Macroinvertebrate data for Susquehanna River at Kirkwood, N.Y.-Continued

Order	Family	Genus	Individuals Collected
Amphipoda	Gammaridae	Gammarus *	
Decapoda	Cambaridae	Cambarus *	
		Orconectes	2
Pelecypoda	Sphaeriidae	Musculium *	
		Pisidium	1
Haplotaxida	Naididae *		
Tricladida	Planariidae	Dugesia	1

* Taxa not collected in 1990

NUMBER OF TAXA: 1986-90: 52
1990: 21

RBP SCORE: 36
DIVERSITY INDEX: 2.45

TABLE A4.--Water quality data for Susquehanna River at Kirkwood, N. Y.

Parameter	Units	10/30/89 1015	03/06/90 1100	05/15/90 1045	07/23/90 1520	09/12/90 1030
Discharge	cfs	2,474	3,592	11,480	753	606.8
Temperature	Celsius	12	1	15	22	21.5
Conductivity	umhos/cm	165	160	110	185	200
Dissolved Oxygen	mg/l	10.4	13.4	10.1	8.1	8.7
Biochemical Oxygen Demand	mg/l	0.4	0.8	--	0.4	0.4
pH		7.8	7.9	7.4	7.8	7.3
Alkalinity	mg/l	48	42	34	60	72
Acidity	mg/l	12	4	--	8	--
Solids - Dissolved	mg/l	100	124	40	126	122
Total	mg/l	102	130	114	130	140
Ammonia as N - Dissolved	mg/l	0.02	0.02	0.02	0.02	0.03
Total	mg/l	0.02	0.02	0.05	0.02	0.03
Nitrite as N - Dissolved	mg/l	0.004	0.004	0.012	0.008	0.008
Total	mg/l	0.004	0.004	0.012	0.008	0.008
Nitrate as N - Dissolved	mg/l	0.79	1.03	0.43	0.45	0.41
Total	mg/l	0.79	1.03	0.47	0.45	0.43
Kjeldahl as N - Dissolved	mg/l	1	0.2	0.27	0.3	0.2
- Total	mg/l	1	0.24	0.38	0.36	0.2
Phosphorus - Dissolved	mg/l	0.03	0.02	0.03	0.03	0.03
Total	mg/l	0.07	0.03	0.07	0.04	0.05
Orthophosphate as P - Dissolved	mg/l	0.011	0.006	0.004	0.002	0.002
Total	mg/l	0.013	0.012	0.22	0.011	0.016
Total Organic Carbon	mg/l	3.1	2	3.4	2.6	1
Magnesium - Total	mg/l	2.92	2.77	2.04	2.91	3.46
Chloride - Total	mg/l	9	10	6	11	11
Sulfate - Total	mg/l	21	14	31	12	24
Turbidity	NTU	6.1	7.5	14.2	2.5	6.8
Iron - Dissolved	ug/l	300	34	59	10	20
Total	ug/l	550	396	1,450	123	249
Manganese - Dissolved	ug/l	50	25	10	10	22
Total	ug/l	80	32	68	29	71
Alumimum - Dissolved	ug/l	150	135	208	135	135
Total	ug/l	150	275	1,050*	135	164
WATER QUALITY INDEX		47	34	50	29	40

* Values exceed water quality standards.

TABLE A5.--Macroinvertebrate data for Cayuta Creek at Waverly, N.Y.

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Optioservus	1
		Stenelmis	9
	Psephenidae	Psephenus	11
Diptera	Athericidae	Atherix	1
	Chironomidae		6
	Simuliidae	Simulium *	
	Tipulidae	Antocha *	
		Hexatoma	1
		Tipula	1
Ephemeroptera	Baetidae	Baetis *	
		Centroptilum *	
		Heterocloeon *	
		Pseudocloeon *	
	Caenidae	Caenis	1
	Ephemerellidae	Ephemerella *	
	Heptageniidae	Epeorus *	
		Heptagenia *	
		Stenacron *	
		Stenonema	2
	Oligoneuriidae	Isonychia	3
	Polymitarcyidae	Ephoron *	
	Tricorythidae	Tricorythodes *	
Lepidoptera	Pyralidae	Petrophila *	
Megaloptera	Corydalidae	Corydalus	1
	Sialidae	Sialis *	
Plecoptera	Perlidae	Acroneuria *	
		Paragnetina *	
		Phasganophora *	
	Perlodidae	Isoperla *	
		Cultus *	
Trichoptera	Brachycentridae	Brachycentrus *	
	Glossosomatidae	Glossosoma	1
	Hydropsychidae	Cheumatopsyche	2
		Hydropsyche *	
		Symphitopsyche	61
	Hydroptilidae	Leucotrichia *	
		Stactobiella *	
	Limnephilidae	Pycnopsyche	1
	Philopotamidae	Chimarra *	
	Polycentropodidae	Nyctiophylax *	
Decapoda	Cambaridae	Orconectes *	
Hydracarina *			
Isopoda	Asellidae	Asellus	6
Limnophila	Physidae	Physa *	
Tricladida	Planariidae	Dugesia *	

* Taxa not collected in 1990

NUMBER OF TAXA: 1986-90: 46
1990: 16

RBP SCORE: 20
DIVERSITY INDEX: 1.62

TABLE A6.--Water quality data for Cayuta Creek at Waverly, N.Y.

Parameter	Units	10/30/89 1410	03/06/90 1430	05/15/90 1445	07/25/90 0820	09/12/90 1300
Discharge	cfs	50.4	--	211	56.16	20.97
Temperature	Celsius	14	5	16	18	21
Conductivity	umhos/cm	280	310	180	240	460
Dissolved Oxygen	mg/l	12.1	13	10.5	9.4	10.3
Biochemical Oxygen Demand	mg/l	0.8	0.8	0.4	0.8	0.8
pH		8.7*	7.8	8.1	7.8	8
Alkalinity	mg/l	80	58	40	80	116
Acidity	mg/l	0	4	--	2	--
Solids - Dissolved	mg/l	174	160	78	134	258
Total	mg/l	176	164	94	142	266
Ammonia as N - Dissolved	mg/l	0.02	0.02	0.01	0.2	0.03
Total	mg/l	0.02	0.02	0.03	0.2	0.03
Nitrite as N - Dissolved	mg/l	0.004	0.004	0.012	0.014	0.01
Total	mg/l	0.004	0.006	0.012	0.014	0.012
Nitrate as N - Dissolved	mg/l	0.57	1.23	0.19	0.29	1.53
Total	mg/l	0.57	1.24	0.23	0.29	1.53
Kjeldahl as N - Dissolved	mg/l	1	0.22	0.2	0.34	0.25
- Total	mg/l	1	0.22	0.25	0.46	0.31
Phosphorus - Dissolved	mg/l	0.14	0.07	0.03	0.04	0.28
Total	mg/l	0.17	0.1	0.05	0.05	0.31
Orthophosphate as P - Dissolved	mg/l	0.12	0.051	0.008	0.02	0.24
Total	mg/l	0.12	0.084	0.023	0.033	0.26
Total Organic Carbon	mg/l	2.9	2.2	2.5	3.8	1
Magnesium - Total	mg/l	6.8	4.65	3.23	4.39	7.06
Chloride - Total	mg/l	21	28	13	15	43
Sulfate - Total	mg/l	25	29	34	24	46
Turbidity	NTU	1.42	1.75	4.5	11.1	2.8
Iron - Dissolved	ug/l	140	64	45	93	23
Total	ug/l	240	87	404	520	95
Manganese - Dissolved	ug/l	50	14	11	10	25
Total	ug/l	50	14	19	26	32
Alumimum - Dissolved	ug/l	150	135	135	135	135
Total	ug/l	150	135	191	303	135
WATER QUALITY INDEX		61	50	40	64	67

* Values exceed water quality standards.

TABLE A7.--Macroinvertebrate data for Troups Creek at Austinburg, Pa.

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Optioservus *	
		Stenelmis	2
	Gyrinidae	Dineutis	1
	Psephenidae	Psephenus	2
Diptera	Athericidae	Atherix	1
	Chironomidae		49
	Empididae	Hemerodromia *	
	Tipulidae	Hexatoma *	
		Tipula *	
Ephemeroptera	Baetidae	Baetis *	
		Pseudocloeon *	
	Caenidae	Caenis	5
	Heptageniidae	Heptagenia	4
		Stenacron	6
		Stenonema	5
	Oligoneuriidae	Isonychia *	
	Tricorythidae	Leptohyphes *	
		Tricorythodes	16
Megaloptera	Corydalidae	Nigronia *	
	Sialidae	Sialis *	
Odonata	Aeshnidae	Boyeria	1
	Coenagrionidae	Argia *	
	Gomphidae	Gomphus *	
		Hagenius *	
		Ophiogomphus *	
		Stylogomphus	4
Plecoptera	Leuctridae	Leuctra	2
	Perlidae	Neoperla *	
		Phasganophora *	
Trichoptera	Hydropsychidae	Cheumatopsyche *	
		Hydropsyche *	
		Potamyia	11
		Symphitopsyche	1
	Hydroptilidae	Stactobiella *	
Limnophila	Physidae	Physa *	

* Taxa not collected in 1990

NUMBER OF TAXA: 1988-90: 34
1990: 15

RBP SCORE: 14
DIVERSITY INDEX: 1.92

TABLE A8.--Water quality data for Troups Creek at Austinburg, Pa.

Parameter	Units	10/31/89 1030	03/07/90 1045	05/16/90 1130	07/26/90 0910	09/13/90 1030
Discharge	cfs	10.9	--	134	6.82	10.62
Temperature	Celsius	11	3	12	17	18
Conductivity	umhos/cm	260	250	170	280	275
Dissolved Oxygen	mg/l	12.6	14.8	11.5	11.3	11.5
Biochemical Oxygen Demand	mg/l	0.5	0.4	0.8	0.4	0.4
pH		8.5	7.7	8.1	8.5	8.15
Alkalinity	mg/l	82	54	52	106	106
Acidity	mg/l	0	4	--	0	--
Solids - Dissolved	mg/l	162	146	118	150	178
Total	mg/l	166	158	372	152	190
Ammonia as N - Dissolved	mg/l	0.02	0.02	0.04	0.02	0.02
Total	mg/l	0.02	0.02	0.04	0.02	0.02
Nitrite as N - Dissolved	mg/l	0.004	0.004	0.012	0.004	0.004
Total	mg/l	0.004	0.004	0.012	0.004	0.004
Nitrate as N - Dissolved	mg/l	0.04	0.95	0.27	0.04	0.04
Total	mg/l	0.04	0.95	0.27	0.04	0.04
Kjeldahl as N - Dissolved	mg/l	1	0.21	0.46	0.2	0.27
- Total	mg/l	1	0.21	0.16	0.2	0.27
Phosphorus - Dissolved	mg/l	0.02	0.02	0.02	0.03	0.03
Total	mg/l	0.07	0.02	0.06	0.03	0.03
Orthophosphate as P - Dissolved	mg/l	0.005	0.002	0.004	0.002	0.002
Total	mg/l	0.013	0.02	0.013	--	0.003
Total Organic Carbon	mg/l	2.9	2.4	5.4	3.1	1.7
Magnesium - Total	mg/l	7.29	5.43	5.47	6.89	6.43
Chloride - Total	mg/l	15	14	10	16	18
Sulfate - Total	mg/l	26	25	34	21	25
Turbidity	NTU	5.2	9.8	144	1.81	1.58
Iron - Dissolved	ug/l	180	10	75	38	19
Total	ug/l	340	221	6,020*	81	85
Manganese - Dissolved	ug/l	50	10	13	10	19
Total	ug/l	50	10	110	10	19
Alumimum - Dissolved	ug/l	150	135	201	135	135
Total	ug/l	150	234	4,470*	135	135
WATER QUALITY INDEX		51	35	62	26	30

* Values exceed water quality standards.

TABLE A9.--Macroinvertebrate data for Cowanesque River at Lawrenceville, Pa.

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Stenelmis *	
	Hydrophilidae	Berosus	4
Diptera	Athericidae	Atherix *	
	Chironomidae		14
	Empididae	Hemerodromia *	
	Simuliidae	Simulium *	
	Tipulidae	Antocha *	
Ephemeroptera	Baetidae	Pseudocloeon *	
	Caenidae	Caenis	1
	Heptageniidae	Heptagenia *	
		Stenonema *	
Megaloptera	Corydalidae	Corydalus *	
Odonata	Coenagrionidae	Argia	17
Trichoptera	Brachycentridae	Brachycentrus *	
	Glossosomatidae	Glossosoma	3
	Hydropsychidae	Cheumatopsyche	7
		Hydropsyche *	
		Symphitopsyche	14
	Hydroptilidae	Stactobiella *	
	Polycentropodidae	Nyctiophylax	6
		Polycentropus *	
Decapoda	Cambaridae	Orconectes	1
Isopoda	Asellidae	Asellus	29
Pelecypoda	Sphaeriidae *		
Tricladida	Planariidae	Dugesia	1

* Taxa not collected in 1990

NUMBER OF TAXA: 1988-90: 26
1990: 11

RBP SCORE: 10

DIVERSITY INDEX: 1.98

TABLE A10.--Water quality data for Cowanesque River at Lawarenceville, Pa.

Parameter	Units	03/07/90 0930	05/16/90 0930	07/24/90 1820	09/13/90 0915
Discharge	cfs	137	275	155	57
Temperature	Celsius	4	12	21.5	20
Conductivity	umhos/cm	180	160	200	250
Dissolved Oxygen	mg/1	13	11.5	8.9	8
Biochemical Oxygen Demand	mg/1	0.4	0.8	1.6	1.2
pH		7.25	7.9	7.4	7.25
Alkalinity	mg/1	32	39	56	82
Acidity	mg/1	4	--	14	--
Solids - Dissolved	mg/1	106	80	96	--
Total	mg/1	122	98	106	--
Ammonia as N - Dissolved	mg/1	0.08	0.04	0.05	0.02
Total	mg/1	0.08	0.04	0.05	0.02
Nitrite as N - Dissolved	mg/1	0.01	0.01	0.004	0.004
Total	mg/1	0.012	0.01	0.004	0.004
Nitrate as N - Dissolved	mg/1	1.07	0.54	0.08	0.88
Total	mg/1	1.07	0.54	0.08	0.04
Kjeldahl as N - Dissolved	mg/1	0.34	0.29	0.24	0.35
- Total	mg/1	0.43	0.5	0.46	0.63
Phosphorus - Dissolved	mg/1	0.02	0.02	0.02	0.03
Total	mg/1	0.04	0.03	0.04	0.04
Orthophosphate as P - Dissolved	mg/1	0.01	0.002	0.002	0.003
Total	mg/1	0.047	0.002	0.005	0.007
Total Organic Carbon	mg/1	3.5	3.7	5.1	2.8
Magnesium - Total	mg/1	3.52	3.74	3.78	5.04
Chloride - Total	mg/1	10	10	11	17
Sulfate - Total	mg/1	23	40	24	27
Turbidity	NTU	20	4.2	4.3	3.1
Iron - Dissolved	ug/1	34	31	38	16
Total	ug/1	669	141	153	61
Manganese - Dissolved	ug/1	50	33	17	57
Total	ug/1	50	43	48	82
Alumimum - Dissolved	ug/1	135	149	135	135
Total	ug/1	40	149	135	135
WATER QUALITY INDEX		45	38	38	53

TABLE A11.--Macroinvertebrate data for Tioga River at Lindley, N.Y.

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Stenelmis *	
	Gyrinidae	Dineutis *	
	Hydrophilidae	Berosus *	
	Psephenidae	Psephenus	2
Diptera	Chironomidae	.....	1
	Empididae	Hemerodromia *	
	Simuliidae	Simulium *	
	Tipulidae	Antocha *	
		Tipula	1
Ephemeroptera	Baetidae	Baetis *	
		Heterocloeon *	
		Pseudocloeon *	
	Heptageniidae	Stenacron *	
		Stenonema	1
	Oligoneuriidae	Isonychia *	
	Siphlonuridae	Ameletus *	
	Tricorythidae	Tricorythodes *	
Megaloptera	Corydalidae	Corydalus *	
		Nigronia *	
Neuroptera	Sisyridae	Climacia *	
Odonata	Coenagrionidae	Argia *	
	Gomphidae	Gomphus *	
		Ophiogomphus	1
Plecoptera	Perlidae	Acroneuria *	
		Perlesta *	
	Perlodidae	Isoperla *	
Trichoptera	Glossosomatidae	Glossosoma *	
	Hydropsychidae	Cheumatopsyche	1
		Hydropsyche *	
		Symphitopsyche *	
	Hydroptilidae	Agraylea *	
		Dibusa *	
		Hydroptila *	
	Philopotamidae	Chimarra	1
	Polycentropodidae	Neureclipsis *	
		Nyctiophylax *	
Amphipoda	Gammaridae	Gammarus *	
Pelecypoda	Sphaeriidae	Pisidium *	
Isopoda	Asellidae	Asellus	2
Haplotaxida	Naididae *		

* Taxa not collected in 1990

NUMBER OF TAXA: 1986-90: 40
1990: 8

RBP SCORE: 18

DIVERSITY INDEX: 2.02

TABLE A12.--Water quality data for Tioga River at Lindley, N.Y.

Parameter	Units	10/31/89 0805	03/07/90 0845	05/16/90 0850	07/24/90 1741	09/13/90 0800
Discharge	cfs	195	430	688	483	521
Temperature	Celsius	11	1	11.5	22	18
Conductivity	umhos/cm	235	195	183	190	240
Dissolved Oxygen	mg/l	10.5	13.4	10.7	10.7	8.1
Biochemical Oxygen Demand	mg/l	2.4	0.8	0.8	9.2	2
pH		8	6.9	6.9	7.4	6.9
Alkalinity	mg/l	28	18	19	30	38
Acidity	mg/l	22	6	--	6	--
Solids - Dissolved	mg/l	148	138	--	106	184
Total	mg/l	152	144	132	112	194
Ammonia as N - Dissolved	mg/l	0.02	0.08	0.05	0.06	0.02
Total	mg/l	0.02	0.08	0.05	0.06	0.02
Nitrite as N - Dissolved	mg/l	0.004	0.006	0.012	0.008	0.004
Total	mg/l	0.004	0.008	0.012	0.008	0.004
Nitrate as N - Dissolved	mg/l	0.59	1	0.47	0.63	0.26
Total	mg/l	0.59	1.31	0.73	0.45	0.26
Kjeldahl as N - Dissolved	mg/l	1	0.28	0.27	0.46	0.33
- Total	mg/l	1	0.34	0.27	0.6	0.35
Phosphorus - Dissolved	mg/l	0.03	0.02	0.02	0.03	0.02
Total	mg/l	0.06	0.03	0.02	0.04	0.04
Orthophosphate as P - Dissolved	mg/l	0.007	0.003	0.002	0.002	0.002
Total	mg/l	0.012	0.018	0.004	0.005	0.007
Total Organic Carbon	mg/l	3	2.3	2.2	3.9	1
Magnesium - Total	mg/l	7.6	5.05	5.37	4.3	6.78
Chloride - Total	mg/l	12	10	8	9	10
Sulfate - Total	mg/l	61	42	55	42	61
Turbidity	NTU	4.8	7.6	3.3	3.1	4.1
Iron - Dissolved	ug/l	190	32	30	10	20
Total	ug/l	280	315	242	172	94
Manganese - Dissolved	ug/l	620*	623*	529*	105	439*
Total	ug/l	650*	668*	608*	152	543*
Alumimum - Dissolved	ug/l	150	135	170	135	135
Total	ug/l	310	135	338	135	135
WATER QUALITY INDEX		59	53	50	48	38

* Values exceed water quality standards.

TABLE A13.--Macroinvertebrate data for Chemung River at Chemung, N.Y.

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Dubiraphia	11
		Optioservus	1
		Stenelmis	6
	Hydrophilidae	Berosus *	
	Psephenidae	Ectopria *	
		Psephenus	5
	Ptilodactylidae	Anchytarsus *	
Diptera	Chironomidae		11
	Empididae	Hemerodromia *	
	Simuliidae	Simulium *	
Ephemeroptera	Baetidae	Baetis *	
		Pseudocloeon *	
	Caenidae	Caenis	1
	Ephemerellidae	Serratella *	
	Ephemeridae	Ephemera *	
	Heptageniidae	Heptagenia *	
		Stenacron *	
		Stenonema	20
	Leptophlebiidae	Paraleptophlebia *	
	Oligoneuriidae	Isonychia *	
	Polymitarcyidae	Ephoron	4
	Potamanthidae	Potamanthus	1
	Siphlonuridae	Parameletus *	
	Tricorythidae	Tricorythodes	3
Lepidoptera	Pyralidae	Petrophila *	
Megaloptera	Sialidae	Sialis *	
Odonata	Coenagrionidae	Argia	1
	Gomphidae	Gomphus	2
		Ophiogomphus *	
Plecoptera	Perlidae	Acroneuria *	
		Neoperla	2
	Perlodidae	Isoperla *	
Trichoptera	Helicopsychidae	Helicopsyche *	
	Hydropsychidae	Cheumatopsyche	5
		Hydropsyche *	
		Symphitopsyche	17
	Hydroptilidae	Dibusa *	
	Limnephilidae	Hydatophylax	3
	Polycentropodidae	Neureclipsis *	
		Nyctiophylax *	
Amphipoda	Talitridae	Hyalella *	
Decapoda	Cambaridae	Cambarus *	
		Orconectes *	
Pelecypoda	Sphaeriidae	Musculium	2

TABLE A13.--Macroinvertebrate data for Chemung River at Chemung, N.Y.--Continued

Order	Family	Genus	Individuals Collected
Limnophila	Physidae	Physa	1
Rhynchobdellida	Glossiphoniidae	Batrachobdella *	
Tricladida	Planariidae	Dugesia	1

* Taxa not collected in 1990

NUMBER OF TAXA: 1986-90: 48
1990: 19

RBP SCORE: 28
DIVERSITY INDEX: 2.50

TABLE A14.--Water quality data for Chemung River at Chemung, N.Y.

Parameter	Units	10/30/89 1445	03/06/90 1530	05/15/90 1520	07/25/90 0950	09/12/90 1415
Discharge	cfs	594	1,720	3,100	1,310	975
Temperature	Celsius	15	4	15	21	23
Conductivity	umhos/cm	380	330	245	305	320
Dissolved Oxygen	mg/l	11.5	13	10.4	8.3	11.6
Biochemical Oxygen Demand	mg/l	0.8	0.8	0.5	0.4	2
pH		8.6*	7.7	8.5	7.4	8.4
Alkalinity	mg/l	94	62	62	88	78
Acidity	mg/l	0	6	--	4	--
Solids - Dissolved	mg/l	224	194	136	192	212
Total	mg/l	232	202	166	206	248
Ammonia as N - Dissolved	mg/l	0.02	0.08	0.02	0.02	0.02
Total	mg/l	0.02	0.08	0.04	0.02	0.02
Nitrite as N - Dissolved	mg/l	0.004	0.01	0.01	0.012	0.01
Total	mg/l	0.004	0.01	0.01	0.012	0.01
Nitrate as N - Dissolved	mg/l	0.88	1.35	0.5	0.6	0.34
Total	mg/l	0.88	1.35	0.56	0.6	0.3
Kjeldahl as N - Dissolved	mg/l	1	0.3	0.32	0.2	0.23
- Total	mg/l	1	0.3	0.42	0.26	0.58
Phosphorus - Dissolved	mg/l	0.06	0.04	0.03	0.05	0.03
Total	mg/l	0.1	0.06	0.05	0.08	0.1
Orthophosphate as P - Dissolved	mg/l	0.051	0.039	0.002	0.027	0.009
Total	mg/l	0.058	0.049	0.013	0.041	0.054
Total Organic Carbon	mg/l	2.9	2.4	3	3.4	1.3
Magnesium - Total	mg/l	9.58	7.01	8	6.91	8.41
Chloride - Total	mg/l	33	36	18	24	26
Sulfate - Total	mg/l	39	30	40	31	50
Turbidity	NTU	3.2	6.1	5.6	11.5	12.1
Iron - Dissolved	ug/l	110	10	24	91	63
Total	ug/l	280	195	331	511	376
Manganese - Dissolved	ug/l	50	93	10	24	27
Total	ug/l	50	100	61	76	86
Alumimum - Dissolved	ug/l	150	135	135	135	135
Total	ug/l	150	135	362	367	299
WATER QUALITY INDEX		66	66	53	63	63

* Values exceed water quality standards.

TABLE A15.--Macroinvertebrate data for Susquehanna River at Sayre, Pa.

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Optioservus *	
		Stenelmis	18
	Gyrinidae	Dineutis	2
	Psephenidae	Ectopria	4
		Psephenus	8
Diptera	Athericidae	Atherix *	
	Chironomidae		4
	Empididae	Hemerodromia *	
	Simuliidae	Simulium *	
Ephemeroptera	Baetidae	Baetis	5
		Pseudocloeon	1
	Caenidae	Caenis	1
	Ephemerellidae	Ephemerella *	
		Serratella	1
	Heptageniidae	Heptagenia *	
		Rhithrogena *	
		Stenacron *	
		Stenonema	12
	Leptophlebiidae	Leptophlebia *	
	Oligoneuriidae	Isonychia	24
	Polymitarcyidae	Ephoron	7
	Potamanthidae	Potamanthus	1
	Tricorythidae	Tricorythodes *	
Lepidoptera	Pyralidae	Petrophila *	
Odonata	Coenagrionidae	Argia *	
Plecoptera	Leuctridae	Leuctra *	
	Perlidae	Neoperla	2
		Phasganophora	2
Trichoptera	Hydropsychidae	Cheumatopsyche	2
		Hydropsyche	5
		Macronemum	4
		Symphitopsyche	6
	Hydroptilidae	Ochrotrichia *	
	Philopotamidae	Chimarra	3
Amphipoda	Gammaridae	Gammarus *	
Annelida	Hirudinea *		
Decapoda	Cambaridae	Cambarus	1
		Orconectes *	
Pelecypoda	Sphaeriidae	Pisidium *	
Limnophila	Physidae	Physa *	

* Taxa not collected in 1990

NUMBER OF TAXA: 1986-90: 40
1990: 21

RBP SCORE: 38
DIVERSITY INDEX: 2.60

TABLE A16.--Water quality data for Susquehanna River at Sayre, Pa.

Parameter	Units	10/30/89 1245	03/06/90 1345	05/15/90 1310	07/24/90 1415	09/12/90 1230
Discharge	cfs	6,120	7,450	23,000	2,044	1,170
Temperature	Celsius	13	2	16	23	22
Conductivity	umhos/cm	195	215	128	275	315
Dissolved Oxygen	mg/1	10.7	13.4	9.9	8.7	9.5
Biochemical Oxygen Demand	mg/1	0.8	0.4	0.4	0.8	1.2
pH		7.9	7.8	7.8	7.7	7.7
Alkalinity	mg/1	60	48	37	84	98
Acidity	mg/1	8	2	--	8	--
Solids - Dissolved	mg/1	150	134	144	74	190
Total	mg/1	160	1.40	168	172	206
Ammonia as N - Dissolved	mg/1	0.04	0.1	0.02	0.02	0.02
Total	mg/1	0.04	0.1	0.05	0.02	0.02
Nitrite as N - Dissolved	mg/1	0.01	0.008	0.012	0.01	0.018
Total	mg/1	0.012	0.008	0.012	0.01	0.018
Nitrate as N - Dissolved	mg/1	0.91	1.24	0.47	0.76	0.68
Total	mg/1	0.91	1.31	0.6	0.96	0.68
Kjeldahl as N - Dissolved	mg/1	1	0.28	0.23	0.2	0.31
- Total	mg/1	1	0.28	0.44	0.3	0.37
Phosphorus - Dissolved	mg/1	0.08	0.02	0.03	0.04	0.04
Total	mg/1	0.14	0.04	0.1	0.07	0.09
Orthophosphate as P - Dissolved	mg/1	0.059	0.011	0.003	0.027	0.029
Total	mg/1	0.067	0.018	0.036	0.034	0.056
Total Organic Carbon	mg/1	3.4	1.9	3.7	2.9	1
Magnesium - Total	mg/1	4.03	3.06	2.67	5.22	5.58
Chloride - Total	mg/1	12	14	11	21	27
Sulfate - Total	mg/1	20	15	31	18	25
Turbidity	NTU	9.8	4.7	26	2.7	7.6
Iron - Dissolved	ug/1	180	26	54	10	54
Total	ug/1	650	175	1,930*	230	214
Manganese - Dissolved	ug/1	50	13	10	10	18
Total	ug/1	50	19	86	25	59
Alumimum - Dissolved	ug/1	150	135	135	135	135
Total	ug/1	190	135	1,180*	231	135
WATER QUALITY INDEX		72	44	54	47	62

* Values exceed water quality standards.

TABLE A17.--Macroinvertebrate data for Susquehanna River at Marietta, Pa.

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Dubiraphia *	
		Optioservus *	
		Stenelmis	4
Diptera	Chironomidae	.....	12
	Empididae	Hemerodromia *	
	Simuliidae	Simulium *	
Ephemeroptera	Baetidae	Baetis	1
		Centroptilum *	
		Pseudocloeon	7
	Caenidae	Caenis	1
	Ephemerellidae	Serratella *	
	Heptageniidae	Heptagenia *	
		Leucrocuta *	
		Stenacron	2
		Stenonema	8
	Oligoneuriidae	Isonychia	8
	Polymitarcyidae	Ephoron *	
	Potamanthidae	Potamanthus *	
	Siphlonuridae	Ameletus *	
	Tricorythidae	Leptohyphes *	
		Tricorythodes *	
Lepidoptera	Pyralidae	Petrophila *	
Megaloptera	Corydalidae	Nigronia *	
Odonata	Coenagrionidae	Argia	1
Trichoptera	Hydropsychidae	Cheumatopsyche	4
		Hydropsyche	9
		Macronemum	39
		Symphitopsyche	4
	Hydroptilidae	Leucotrichia *	
		Stactobiella *	
	Philopotamidae	Chimarra	4
	Polycentropodidae	Nyctiophylax *	
Amphipoda	Gammaridae	Gammarus *	
Decapoda	Cambaridae	Cambarus *	
		Orconectes	1
		Procambarus *	
Pelecypoda	Sphaeriidae	Musculium *	
		Pisidium	1
Lumbriculida	Lumbriculidae	Rhynchelmis	1
Tricladida	Planariidae	Dugesia *	

* Taxa not collected in 1990
NUMBER OF TAXA: 1986-90: 41
1990: 17

RBP SCORE: 26
DIVERSITY INDEX: 2.18

TABLE A18.--Water quality data for Susquehanna River at Marietta, Pa.

Parameter	Units	10/03/89 1445	12/13/89 1140	04/17/90 1000	06/13/90 1045	08/02/90 1315
Discharge	cfs	--	--	60,990	--	--
Temperature	Celsius	20	2	12	21.5	22
Conductivity	umhos/cm	320	275	155	240	250
Dissolved Oxygen	mg/l	9.7	13.6	10.8	9.5	8.8
Biochemical Oxygen Demand	mg/l	1.6	0.4	0.4	1.6	0.4
pH		8.7*	7.9	8.2	7.9	7.8
Alkalinity	mg/l	62	--	26	37	40
Acidity	mg/l	0	--	--	2	3
Solids - Dissolved	mg/l	208	118	292	174	134
Total	mg/l	240	130	370	210	148
Ammonia as N - Dissolved	mg/l	0.05	0.13	0.06	0.02	0.02
Total	mg/l	0.02	0.13	0.06	0.02	0.02
Nitrite as N - Dissolved	mg/l	0.01	0.012	0.016	0.008	0.006
Total	mg/l	0.01	0.012	0.014	0.008	0.006
Nitrate as N - Dissolved	mg/l	0.96	1.55	0.016	1.05	0.5
Total	mg/l	0.96	1.55	1.1	1.05	0.5
Kjeldahl as N - Dissolved	mg/l	1	0.37	0.31	0.22	0.2
- Total	mg/l	1	0.39	0.77	0.48	0.32
Phosphorus - Dissolved	mg/l	0.03	0.03	0.02	0.02	0.02
Total	mg/l	0.09	0.05	0.04	0.06	0.03
Orthophosphate as P - Dissolved	mg/l	0.002	0.008	0.011	0.007	0.002
Total	mg/l	0.017	0.013	0.04	0.013	0.006
Total Organic Carbon	mg/l	3.8	2.5	2.3	2.3	2.1
Magnesium - Total	mg/l	9.95	8.6	3.79	7.71	7.66
Chloride - Total	mg/l	18	15	10	11	11
Sulfate - Total	mg/l	60	56	30	54	66
Turbidity	NTU	14.5	2.6	23	15.3	4.7
Iron - Dissolved	ug/l	100	150	100	990*	280
Total	ug/l	620	550	1,770*	1,110	340
Manganese - Dissolved	ug/l	50	140	70	150	50
Total	ug/l	140	170	230	150	70
Alumimum - Dissolved	ug/l	150	230	150	1,290*	360
Total	ug/l	750*	360	890*	1,290*	470
WATER QUALITY INDEX		57	47	49	52	33

* Values exceed water quality standards.

TABLE A19.--Macroinvertebrate data for Scott Creek at Delta, Pa.

Order	Family	Genus	Individuals Collected
Diptera	Chironomidae		36
	Empididae	Hemerodromia *	
	Simuliidae	Simulium	12
	Tabanidae	Chrysops	7
	Tipulidae	Antocha	2
		Pedicia *	
		Tipula *	
Ephemeroptera	Baetidae	Baetis *	
Odonata	Gomphidae	Gomphus	2
Trichoptera	Glossosomatidae	Glossosoma *	
	Hydropsychidae	Hydropsyche	7
		Symphitopsyche	14
Decapoda	Cambaridae	Cambarus	2
Isopoda	Asellidae	Asellus *	
Limnophila	Physidae	Physa	17
Haplotaxida	Naididae	Nais *	

* Taxa not collected in 1990

NUMBER OF TAXA: 1989-90: 16
1990: 9

RBP SCORE: 10

DIVERSITY INDEX: 1.83

TABLE A20.--Water quality data for Scott Creek at Delta, Pa.

Parameter	Units	10/02/89 1155	12/06/89 1120	04/18/90 1225	06/12/90 1315	08/01/90 1000
Discharge	cfs	--	0.451	1.02	0.744	0.214
Temperature	Celsius	18	4	10	17	16
Conductivity	umhos/cm	310	440	260	230	235
Dissolved Oxygen	mg/l	6.6	9.9	12	4.3*	8.2
Biochemical Oxygen Demand	mg/l	16	69	1.2	24	0.4
pH		7.3	6.4*	7.5	7.05	7.6
Alkalinity	mg/l	60	88	48	61	64
Acidity	mg/l	46	24	--	14.5	8
Solids - Dissolved	mg/l	182	272	216	162	184
Total	mg/l	224	314	222	198	184
Ammonia as N - Dissolved	mg/l	0.08	0.44	0.07	0.04	0.41
Total	mg/l	0.04	0.27	0.07	0.04	0.41
Nitrite as N - Dissolved	mg/l	0.192	0.092	0.024	0.118	0.122
Total	mg/l	0.44	0.086	0.024	0.022	0.122
Nitrate as N - Dissolved	mg/l	1.34	1.14	2.4	0.39	1.24
Total	mg/l	0.33	0.94	2.4	0.04	1.24
Kjeldahl as N - Dissolved	mg/l	1.12	1.73	0.4	1.2	0.67
- Total	mg/l	2.29	2.4	0.52	3.1	0.78
Phosphorus - Dissolved	mg/l	0.37	0.14	0.05	0.11	0.08
Total	mg/l	0.84	0.42	0.08	0.65	0.17
Orthophosphate as P - Dissolved	mg/l	0.23	0.029	0.049	0.035	0.062
Total	mg/l	0.38	.072	0.058	0.65	0.08
Total Organic Carbon	mg/l	24.2	37.3	2.1	9.1	2.4
Magnesium - Total	mg/l	12.2	15.7	12.7	7.69	9.01
Chloride - Total	mg/l	33	53	30	45	28
Sulfate - Total	mg/l	41	30	24	22	15
Turbidity	NTU	35	11.2	3.8	6.4	3.4
Iron - Dissolved	ug/l	1,090*	2,050*	145	274	164
Total	ug/l	3,520*	3,600*	450	721	832
Manganese - Dissolved	ug/l	780	1,520*	115	1,080*	188
Total	ug/l	850	1,640*	130	1,090*	227
Alumimum - Dissolved	ug/l	150	150	372	135	227
Total	ug/l	1,030*	190	429	135	150
WATER QUALITY INDEX		83	82	65	68	67

* Values exceed water quality standards.

TABLE A21.--Macroinvertebrate data for Conowingo Creek at Pleasant Grove, Pa.

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Macronychus *	
		Ordobrevia *	
		Optioservus	5
		Stenelmis	6
	Hydrophilidae	Berosus *	
	Psephenidae	Psephenus *	
Diptera	Athericidae	Atherix	1
	Chironomidae		2
	Empididae	Hemerodromia *	
	Simuliidae	Simulium	1
	Tipulidae	Antocha *	
		Tipula	1
Ephemeroptera	Baetidae	Baetis	5
	Caenidae	Caenis *	
	Ephemerellidae	Serratella *	
	Heptageniidae	Heptagenia	2
		Stenacron *	
		Stenonema	14
	Leptophlebiidae	Paraleptophlebia *	
	Oligoneuriidae	Isonychia	12
	Siphlonuridae	Ameletus *	
Megaloptera	Corydalidae	Corydalus	4
		Chauliodes	2
		Nigronia *	
	Sialidae	Sialis *	
Odonata	Coenagrionidae	Argia *	
Plecoptera	Leuctridae	Leuctra *	
Trichoptera	Brachycentridae	Micrasema *	
	Hydropsychidae	Cheumatopsyche	8
		Hydropsyche	11
		Symphitopsyche	21
	Hydroptilidae	Leucotrichia *	
	Philopotamidae	Chimarra	2
Hydracarina			1
Decapoda	Cambaridae	Cambarus	1
		Orconectes *	
Isopoda	Asellidae	Asellus *	
Lumbriculida	Lumbriculidae	Rhynchelmis	1

* Taxa not collected in 1990

NUMBER OF TAXA: 1986-90: 38
1990: 19

RBP SCORE: 36
DIVERSITY INDEX: 2.52

TABLE A22.--Water quality data for Conowingo Creek at Pleasant Grove, Pa.

Parameter	Units	10/03/89 1015	12/07/89 1120	04/18/90 1020	06/12/90 1015	08/02/90 1030
Discharge	cfs	--	27.6	36.2	30.6	21.85
Temperature	Celsius	18	5	8.5	18	18
Conductivity	umhos/cm	270	190	190	200	195
Dissolved Oxygen	mg/l	8.7	13.5	12.3	8.3	8.5
Biochemical Oxygen Demand	mg/l	0.8	0.8	0.4	0.4	1.2
pH		7.5	7.6	7.4	7.5	7.4
Alkalinity	mg/l	46	24	28	29	36
Acidity	mg/l	10	4	--	3.5	6
Solids - Dissolved	mg/l	208	158	124	184	162
Total	mg/l	240	158	138	222	188
Ammonia as N - Dissolved	mg/l	0.21	0.02	0.02	0.04	0.05
Total	mg/l	0.25	0.02	0.02	0.04	0.05
Nitrite as N - Dissolved	mg/l	0.096	0.012	0.028	0.032	0.03
Total	mg/l	0.096	0.012	0.028	0.032	0.03
Nitrate as N - Dissolved	mg/l	5.95	7.25	7.23	7.7	6.99
Total	mg/l	5.95	8.46	7.23	7.47	6.99
Kjeldahl as N - Dissolved	mg/l	1.07	0.2	0.56	0.3	0.66
- Total	mg/l	1.43	0.2	0.63	0.48	0.66
Phosphorus - Dissolved	mg/l	0.31	0.03	0.03	0.03	0.05
Total	mg/l	0.43	0.04	0.04	0.08	0.08
Orthophosphate as P - Dissolved	mg/l	0.26	0.002	0.018	0.021	0.018
Total	mg/l	0.29	0.005	0.022	0.035	0.04
Total Organic Carbon	mg/l	9.4	1.2	3.6	1.9	3.2
Magnesium - Total	mg/l	10.1	8.22	9.5	7.68	7.94
Chloride - Total	mg/l	15	15	14	15	16
Sulfate - Total	mg/l	23	15	16	22	40
Turbidity	NTU	29	2.4	6.3	13.6	12.7
Iron - Dissolved	ug/l	210	620*	124	67	48
Total	ug/l	1,670*	620	434	447	639
Manganese - Dissolved	ug/l	50	50	76	39	36
Total	ug/l	80	50	79	60	58
Alumimum - Dissolved	ug/l	150	150	372	135	135
Total	ug/l	1,360*	150	491	680*	423
WATER QUALITY INDEX		79	33	49	53	61

* Values exceed water quality standards.

TABLE A23.--Macroinvertebrate data for Octoraro Creek at Rising Sun, Md.

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Optioservus	1
		Stenelmis	2
	Psephenidae	Psephenus *	
Diptera	Chironomidae		15
	Empididae	Hemerodromia *	
	Simuliidae	Simulium *	
	Tipulidae	Antocha	2
Ephemeroptera	Baetidae	Baetis	6
		Neocloeon *	
		Pseudocloeon	5
	Ephemerellidae	Ephemerella *	
		Serratella	1
	Heptageniidae	Heptagenia *	
		Stenonema	2
	Oligoneuriidae	Isonychia *	
	Siphlonuridae	Siphlonurus	1
	Tricorythidae	Leptohyphes *	
		Tricorythodes *	
Megaloptera	Corydalidae	Corydalus *	
	Sialidae	Sialis	1
Odonata	Coenagrionidae	Argia *	
Plecoptera	Perlidae	Acroneuria *	
Trichoptera	Brachycentridae	Brachycentrus	31
		Micrasema *	
	Hydropsychidae	Cheumatopsyche	17
		Hydropsyche	3
		Macronemum *	
		Symphitopsyche	12
	Hydroptilidae	Leucotrichia	3
		Stactobiella *	
	Philopotamidae	Chimarra	7
Amphipoda	Gammaridae	Gammarus *	
Cladocera	Leptodoridae	Leptodora *	
Pelecypoda	Corbiculidae	Corbicula *	
	Sphaeriidae	Pisidium	1
Haplotaxida	Naididae	*	
Tricladida	Planariidae	Dugesia *	

* Taxa not collected in 1990

NUMBER OF TAXA: 1986-90: 37
1990: 17

RBP SCORE: 34
DIVERSITY INDEX: 2.25

TABLE A24.--Water quality data for Octoraro Creek at Rising Sun, Md.

Parameter	Units	10/03/89 1110	12/07/89 1045	04/18/90 1100	06/12/90 1100
Discharge	cfs	--	--	--	159
Temperature	Celsius	19	4	10	21
Conductivity	umhos/cm	240	210	200	205
Dissolved Oxygen	mg/1	9.1	13.3	12	9.2
Biochemical Oxygen Demand	mg/1	0.4	0.8	1.6	0.8
pH		7.9	7.9	7.85	7.9
Alkalinity	mg/1	44	--	35	36
Acidity	mg/1	2	--	--	3
Solids - Dissolved	mg/1	168	156	156	166
Total	mg/1	186	166	176	188
Ammonia as N - Dissolved	mg/1	0.04	0.02	0.02	0.04
Total	mg/1	0.04	0.02	0.02	0.04
Nitrite as N - Dissolved	mg/1	0.03	0.018	0.026	0.046
Total	mg/1	0.032	0.018	0.028	0.046
Nitrate as N - Dissolved	mg/1	5.78	6.03	6.26	6
Total	mg/1	5.78	6.03	6.5	5.52
Kjeldahl as N - Dissolved	mg/1	1	0.2	0.48	0.64
- Total	mg/1	1	0.49	0.84	0.9
Phosphorus - Dissolved	mg/1	0.13	0.03	0.02	0.04
Total	mg/1	0.18	0.05	0.07	0.09
Orthophosphate as P - Dissolved	mg/1	0.099	0.002	0.007	0.025
Total	mg/1	0.11	0.007	0.009	0.043
Total Organic Carbon	mg/1	5.2	2.3	3.7	3.7
Magnesium - Total	mg/1	10.3	8.6	8.16	8.05
Chloride - Total	mg/1	14	15	34	13
Sulfate - Total	mg/1	23	23	21	24
Turbidity	NTU	10.6	3.1	11.6	7.7
Iron - Dissolved	ug/1	100	170	210	400*
Total	ug/1	620	230	460	400
Manganese - Dissolved	ug/1	50	50	70	50
Total	ug/1	70	50	110	80
Alumimum - Dissolved	ug/1	150	150	420	760*
Total	ug/1	440	150	310	820*
WATER QUALITY INDEX		63	35	56	64

* Values exceed water quality standards.

TABLE A25.--Macroinvertebrate data for Ebaughs Creek at Stewartstown, Pa.

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Optioservus	13
		Stenelmis	1
	Psephenidae	Psephenus	4
Diptera	Athericidae	Atherix *	
	Chironomidae		9
	Empididae	Hemerodromia *	
	Simuliidae	Simulium *	
	Tipulidae	Antocha	2
		Tipula *	
Ephemeroptera	Baetidae	Baetis	13
		Centroptilum *	
		Pseudocloeon *	
	Caenidae	Caenis *	
	Ephemerellidae	Drunella *	
		Eurylophella *	
		Serratella	2
	Ephemeridae	Ephemera *	
	Heptageniidae	Epeorus	3
		Heptagenia *	
		Stenonema	8
	Leptophlebiidae	Leptophlebia *	
		Paraleptophlebia *	
	Oligoneuriidae	Isonychia	6
	Polymitarcyidae	Ephoron *	
	Potamanthidae	Potamanthus *	
	Tricorythidae	Leptohyphes *	
Megaloptera	Corydalidae	Nigronia	2
Odonata	Aeshnidae	Boyeria *	
	Gomphidae	Gomphus *	
		Ophiogomphus *	
Plecoptera	Leuctridae	Leuctra	1
	Perlidae	Acroneuria *	
		Phasganophora *	
Trichoptera	Glossosomatidae	Glossosoma	6
	Hydropsychidae	Cheumatopsyche *	
		Hydropsyche	8
		Symphitopsyche	30
	Hydroptilidae	Dibusa *	
		Leucotrichia *	
	Philopotamidae	Chimarra *	
	Polycentropodidae	Nyctiophylax *	
Decapoda	Cambaridae	Cambarus *	
Lumbriculida	Lumbriculidae	Rhynchelmis	1
Tricladida	Planariidae	Dugesia *	

* Taxa not collected in 1990

NUMBER OF TAXA: 1986-90: 45
1990: 16

RBP SCORE: 34
DIVERSITY INDEX: 2.22

TABLE A26.--Water quality data for Ebaughs Creek at Stewartstown, Pa.

Parameter	Units	10/02/89 1045	12/06/89 1020	04/18/90 1340	06/18/90 1045	07/30/90 1430
Discharge	cfs	--	5.99	7.93	7.61	5.17
Temperature	Celsius	17	3	11	18	19
Conductivity	umhos/cm	145	145	220	315	210
Dissolved Oxygen	mg/l	8.9	12.2	11.6	9.6	9.6
Biochemical Oxygen Demand	mg/l	1.2	0.4	0.4	1.6	0.4
pH		7.2	8.3	7.45	7.5	7.5
Alkalinity	mg/l	28	16	18	22	2.4
Acidity	mg/l	12	0	--	3	6
Solids - Dissolved	mg/l	82	92	174	208	122
Total	mg/l	120	108	184	230	128
Ammonia as N - Dissolved	mg/l	0.21	0.03	0.2	0.05	0.02
Total	mg/l	0.21	0.03	0.2	0.05	0.02
Nitrite as N - Dissolved	mg/l	0.04	0.02	0.07	0.054	0.006
Total	mg/l	0.044	0.02	0.07	0.056	0.006
Nitrate as N - Dissolved	mg/l	4.32	6.98	5.74	5.75	6.52
Total	mg/l	4.32	6.98	5.74	5.75	6.52
Kjeldahl as N - Dissolved	mg/l	0.5	0.2	0.64	0.38	0.2
- Total	mg/l	0.63	0.2	0.75	0.4	0.2
Phosphorus - Dissolved	mg/l	0.05	0.04	0.02	0.03	0.03
Total	mg/l	0.09	0.04	0.03	0.04	0.04
Orthophosphate as P - Dissolved	mg/l	0.014	0.009	0.007	0.01	0.013
Total	mg/l	0.039	0.011	0.007	0.019	0.02
Total Organic Carbon	mg/l	4.3	1	1	1.9	1.3
Magnesium - Total	mg/l	4.78	4.64	4.87	4.12	4.71
Chloride - Total	mg/l	11	13	40	53	29
Sulfate - Total	mg/l	24	10	10	11	12
Turbidity	NTU	25	3.6	2.3	1	5.1
Iron - Dissolved	ug/l	270	350*	29	111	40
Total	ug/l	1,780*	480	161	514	315
Manganese - Dissolved	ug/l	50	50	30	72	40
Total	ug/l	90	50	33	91	51
Alumimum - Dissolved	ug/l	150	150	135	135	135
Total	ug/l	930*	210	135	332	135
WATER QUALITY INDEX		58	33	38	51	28

* Values exceed water quality standards.

TABLE A27.--Macroinvertebrate data for Deer Creek at Gorsuch Mills, Md.

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Macronychus *	
		Optioservus	5
		Stenelmis	3
	Gyrinidae	Dineutis *	
	Psephenidae	Psephenus *	
	Ptilodactylidae	Anchytarsus *	
Diptera	Athericidae	Atherix	6
	Chironomidae	.....	9
	Empididae	Hemerodromia *	
	Simuliidae	Simulium *	
	Tipulidae	Antocha *	
		Tipula *	
Ephemeroptera	Baetidae	Baetis	3
		Centroptilum *	
		Neocloeon *	
		Pseudocloeon *	
	Caenidae	Caenis *	
	Ephemerellidae	Ephemerella	2
		Eurylophella *	
	Heptageniidae	Epeorus *	
		Heptagenia *	
		Ironodes	1
		Stenonema	6
	Leptophlebiidae	Paraleptophlebia *	
	Oligoneuriidae	Isonychia	17
	Siphlonuridae	Parameletus *	
	Tricorythidae	Tricorythodes *	
Lepidoptera	Pyralidae	Petrophila *	
Megaloptera	Corydalidae	Corydalus	1
		Nigronia *	
	Sialidae	Sialis *	
Plecoptera	Leuctridae	Leuctra	1
	Perlidae	Acroneuria	3
		Paragnetina *	
		Phasganophora *	
	Perlodidae	Isoperla *	
	Taeniopterygidae	Strophopteryx *	
Trichoptera	Brachycentridae	Brachycentrus *	
	Glossosomatidae	Glossosoma *	
	Hydropsychidae	Cheumatopsyche	5
		Hydropsyche	3
		Symphitopsyche	33
	Hydroptilidae	Dibusa *	
		Leucotrichia *	
		Stactobiella *	
	Philopotamidae	Chimarra *	

TABLE A27.--Macroinvertebrate data for Deer Creek at Gorsuch Mills, Md.--Continued

Order	Family	Genus	Individuals Collected
Hydracarina *			
Decapoda	Cambaridae	Cambarus	2
Lumbriculida	Lumbriculidae	Rhynchelmis *	

* Taxa not collected in 1990

NUMBER OF TAXA: 1986-90: 49
1990: 16

RBP SCORE: 28

DIVERSITY INDEX: 2.28

TABLE A28.--Water quality data for Deer Creek at Gorsuch Mills, Md.

Parameter	Units	10/02/89 1000	12/06/89 0940	04/18/90 1425	06/18/90 1150	07/31/90 1030
Discharge	cfs	--	13.4	17.1	15.5	7.71
Temperature	Celsius	17	5	11	22	19.5
Conductivity	umhos/cm	187	150	155	145	170
Dissolved Oxygen	mg/l	9.1	12.7	11.4	10.2	9.5
Biochemical Oxygen Demand	mg/l	1.6	0.4	0.5	1.6	0.4
pH		7.6	7.9	7.75	7.8	7.9
Alkalinity	mg/l	36	24	25	30	40
Acidity	mg/l	8	2	--	1	4
Solids - Dissolved	mg/l	116	94	128	122	138
Total	mg/l	188	112	136	148	156
Ammonia as N - Dissolved	mg/l	0.14	0.02	0.02	0.05	0.02
Total	mg/l	0.14	0.02	0.02	0.05	0.02
Nitrite as N - Dissolved	mg/l	0.016	0.004	0.012	0.012	0.008
Total	mg/l	0.018	0.006	0.012	0.012	0.008
Nitrate as N - Dissolved	mg/l	4.34	5.28	4.83	4.59	4.35
Total	mg/l	4.34	5.28	4.83	4.59	4.35
Kjeldahl as N - Dissolved	mg/l	0.5	0.2	0.28	0.32	0.24
- Total	mg/l	0.84	0.38	0.32	0.48	0.49
Phosphorus - Dissolved	mg/l	0.06	0.03	0.02	0.03	0.03
Total	mg/l	0.17	0.03	0.02	0.04	0.03
Orthophosphate as P - Dissolved	mg/l	0.03	0.003	0.006	0.004	0.005
Total	mg/l	0.043	0.006	0.006	0.01	0.01
Total Organic Carbon	mg/l	4.3	1.1	1	1.9	1.6
Magnesium - Total	mg/l	5.8	4.96	4.91	5.15	5.67
Chloride - Total	mg/l	17	16	15	15	15
Sulfate - Total	mg/l	24	10	10	10	15
Turbidity	NTU	48	5.7	2.8	4.2	2.7
Iron - Dissolved	ug/l	890*	250	35	54	32
Total	ug/l	2,630*	450	324	652	381
Manganese - Dissolved	ug/l	60	50	23	31	21
Total	ug/l	170	50	30	51	31
Alumimum - Dissolved	ug/l	150	150	135	135	150
Total	ug/l	1,610*	200	135	436	236
WATER QUALITY INDEX		68	24	22	37	29

* Values exceed water quality standards.

TABLE A29.--Water quality data for Susquehanna River at Conowingo, Md.

Parameter	Units	10/03/89 1240	12/07/89 1015	04/17/90 1310	06/13/90 1320	08/01/90 1100
Discharge	cfs	51,200	27,500	74,000	49,900	6,250
Temperature	Celsius	21	4	12	22	24
Conductivity	umhos/cm	410	210	170	625	228
Dissolved Oxygen	mg/l	7.9	13.7	11.2	9	8.5
Biochemical Oxygen Demand	mg/l	0.8	0.4	0.4	1.2	0.8
pH		7.8	8	--	7.95	8.02
Alkalinity	mg/l	74	--	30	48	44
Acidity	mg/l	5	--	--	3	2
Solids - Dissolved	mg/l	250	164	286	328	146
Total	mg/l	302	174	310	356	146
Ammonia as N - Dissolved	mg/l	0.1	0.05	0.06	0.08	0.05
Total	mg/l	0.1	0.05	0.05	0.08	0.05
Nitrite as N - Dissolved	mg/l	0.054	0.008	0.012	0.016	0.022
Total	mg/l	0.054	0.008	0.012	0.016	0.022
Nitrate as N - Dissolved	mg/l	1.49	2.5	0.012	1.37	0.88
Total	mg/l	1.53	2.63	1.52	1.37	0.88
Kjeldahl as N - Dissolved	mg/l	1	0.3	0.31	0.42	0.26
- Total	mg/l	1	0.3	0.4	0.67	0.36
Phosphorus - Dissolved	mg/l	0.04	0.03	0.03	0.02	0.02
Total	mg/l	0.13	0.05	0.04	0.06	0.04
Orthophosphate as P - Dissolved	mg/l	0.003	0.003	0.014	0.012	0.002
Total	mg/l	0.028	0.008	0.033	0.039	0.009
Total Organic Carbon	mg/l	3.4	2.3	2.5	2.7	2.5
Magnesium - Total	mg/l	14.2	6.72	4.4	5.83	6.96
Chloride - Total	mg/l	23	13	10	92	10
Sulfate - Total	mg/l	85	35	30	38	47
Turbidity	NTU	19.8	5.9	25	8.8	5.5
Iron - Dissolved	ug/l	100	150	50	208	10
Total	ug/l	1,280	400	1,280	1,080	214
Manganese - Dissolved	ug/l	50	50	103	10	10
Total	ug/l	420	60	163	10	98
Alumimum - Dissolved	ug/l	150	150	138	135	150
Total	ug/l	1,160*	150	683*	397	211
WATER QUALITY INDEX		72	35	47	58	38

* Values exceed water quality standards.

APPENDIX B.—DATA FOR GROUP 2 STATIONS

TABLE B1.--Macroinvertebrate data for Cascade Creek at Lanesboro, Pa., 1988-90

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Stenelmis *	
	Psephenidae	Psephenus *	
Diptera	Athericidae	Atherix	1
	Chironomidae		7
	Simuliidae	Simulium *	
	Tipulidae	Hexatoma *	
Ephemeroptera	Baetidae	Baetis	1
		Pseudocloeon *	
	Caenidae	Caenis	1
	Ephemeridae	Ephemera	1
	Heptageniidae	Epeorus *	
		Heptagenia *	
		Stenacron *	
		Stenonema	7
	Leptophlebiidae	Leptophlebia *	
	Oligoneuriidae	Isonychia	25
	Tricorythidae	Leptohyphes *	
Megaloptera	Corydalidae	Nigronia	10
	Sialidae	Sialis *	
Odonata	Aeshnidae	Boyeria *	
	Calopterygidae	Hetaerina *	
	Gomphidae	Gomphus	4
		Hagenius *	
Plecoptera	Perlidae	Acroneuria	16
		Phasganophora	10
	Pteronarcyidae	Pteronarcys *	
Trichoptera	Hydropsychidae	Cheumatopsyche	3
		Hydropsyche *	
		Symphitopsyche *	
	Limnephilidae	Hydatophylax	1
	Philopotamidae	Chimarra	6
Decapoda	Cambaridae	Orconectes	6
		Procambarus *	

* Taxa not collected in 1990
NUMBER OF TAXA: 1988-90: 33
1990: 15

RBP SCORE: 24
DIVERSITY INDEX: 2.31

TABLE B2.--Water quality data for Cascade Creek at Lanesboro, Pa., 1988-90

Parameter	Units	07/23/90 1300
Discharge	cfs	1.33
Temperature	Celsius	20.5
Conductivity	umhos/cm	85
Dissolved Oxygen	mg/l	7.8
Biochemical Oxygen Demand	mg/l	0.4
pH		7.55
Alkalinity	mg/l	30
Acidity	mg/l	9
Solids - Dissolved	mg/l	68
- Total	mg/l	78
Ammonia as N - Dissolved	mg/l	0.02
Total	mg/l	0.02
Nitrite as N - Dissolved	mg/l	0.008
Total	mg/l	0.008
Nitrate as N - Dissolved	mg/l	0.12
Total	mg/l	0.12
Kjeldahl as N - Dissolved	mg/l	0.37
Total	mg/l	0.37
Phosphorus - Dissolved	mg/l	0.03
Total	mg/l	0.07
Orthophosphate as P - Dissolved	mg/l	0.006
Total	mg/l	0.014
Total Organic Carbon	mg/l	4.4
Magnesium - Total	mg/l	2.35
Chloride - Total	mg/l	4
Sulfate - Total	mg/l	18
Turbidity	NTU	1
Iron - Dissolved	ug/l	459*
Total	ug/l	1,350
Manganese - Dissolved	ug/l	224
Total	ug/l	851*
Alumimum - Dissolved	ug/l	135
Total	ug/l	207
WATER QUALITY INDEX		39

* Values exceed water quality standards.

TABLE B3.--Macroinvertebrate data for Trowbridge Creek at Great Bend, Pa., 1988-90

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Stenelmis	3
	Psephenidae	Psephenus	4
Diptera	Athericidae	Atherix *	
	Chironomidae		17
	Empididae	Hemerodromia *	
	Simuliidae	Simulium *	
	Tipulidae	Antocha	1
		Hexatoma	6
		Pedicia *	
		Tipula *	
Ephemeroptera	Baetidae	Baetis	3
		Neocloeon *	
	Heptageniidae	Heptagenia *	
		Stenacron	1
		Stenonema	1
	Oligoneuriidae	Isonychia	2
	Potamanthidae	Potamanthus *	
Megaloptera	Corydalidae	Nigronia	3
	Sialidae	Sialis	1
Odonata	Aeshnidae	Boyeria *	
	Gomphidae	Ophiogomphus *	
Plecoptera	Capniidae	Paracapnia *	
	Perlidae	Paragnetina *	
		Phasganophora	3
Trichoptera	Hydropsychidae	Cheumatopsyche	1
		Potamyia	23
		Symphitopsyche	5
	Philopotamidae	Dolophilodes *	

* Taxa not collected in 1990

NUMBER OF TAXA: 1988-90: 28
1990: 20

RBP SCORE: 20
DIVERSITY INDEX: 2.16

TABLE B4.--Water quality data for Trowbridge Creek at Great Bend, Pa., 1988-90

Parameter	Units	07/24/90 0730
Discharge	cfs	3.04
Temperature	Celsius	16
Conductivity	umhos/cm	85
Dissolved Oxygen	mg/l	10.4
Biochemical Oxygen Demand	mg/l	0.4
pH		7.6
Alkalinity	mg/l	28
Acidity	mg/l	4
Solids - Dissolved	mg/l	46
- Total	mg/l	54
Ammonia as N - Dissolved	mg/l	0.02
Total	mg/l	0.02
Nitrite as N - Dissolved	mg/l	0.004
Total	mg/l	0.004
Nitrate as N - Dissolved	mg/l	0.2
Total	mg/l	0.2
Kjeldahl as N - Dissolved	mg/l	0.2
Total	mg/l	0.2
Phosphorus - Dissolved	mg/l	0.23
Total	mg/l	0.33
Orthophosphate as P - Dissolved	mg/l	0.007
Total	mg/l	0.011
Total Organic Carbon	mg/l	2.2
Magnesium - Total	mg/l	2.27
Chloride - Total	mg/l	6
Sulfate - Total	mg/l	10
Turbidity	NTU	1.42
Iron - Dissolved	ug/l	19
Total	ug/l	120
Manganese - Dissolved	ug/l	10
Total	ug/l	10
Alumimum - Dissolved	ug/l	135
Total	ug/l	135
WATER QUALITY INDEX		16

TABLE B5.--Macroinvertebrate data for Snake Creek at Brookdale, Pa., 1986-90

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Macronychus *	
		Optioservus	2
		Stenelmis	14
	Psephenidae	Psephenus	10
Diptera	Athericidae	Atherix *	
	Chironomidae		2
	Tipulidae	Antocha *	
		Tipula *	
Ephemeroptera	Baetidae	Baetis *	
		Centroptilum *	
		Heterocloeon *	
		Neocloeon *	
		Pseudocloeon *	
	Caenidae	Caenis	6
	Ephemerellidae	Ephemerella *	
		Serratella *	
	Ephemeridae	Ephemera	1
	Heptageniidae	Epeorus	5
		Heptagenia	3
		Stenacron *	
		Stenonema	9
	Leptophlebiidae	Paraleptophlebia	5
	Oligoneuriidae	Isonychia	10
	Polymitarcyidae	Ephoron	2
	Potamanthidae	Potamanthus	4
	Tricorythidae	Tricorythodes	4
Megaloptera	Corydalidae	Corydalus *	
		Chauliodes	2
		Nigronia *	
	Sialidae	Sialis *	
Odonata	Gomphidae	Gomphus	2
		Ophiogomphus	3
Plecoptera	Leuctridae	Leuctra *	
	Nemouridae	Amphinemura *	
	Perlidae	Acroneuria	3
		Neoperla	1
		Paragnetina *	
		Phasganophora *	
	Perlodidae	Isoperla *	
	Pteronarcyidae	Pteronarcys *	
Trichoptera	Hydropsychidae	Cheumatopsyche	2
		Hydropsyche *	
		Macronemum	1
		Parapsyche *	
		Symphitopsyche	17

TABLE B5.--Macroinvertebrate data for Snake Creek at Brookdale, Pa., 1986-90--Continued

Order	Family	Genus	Individuals Collected
	Hydroptilidae	Leucotrichia *	
	Leptoceridae	Mystacides	2
	Limnephilidae	Hydatophylax	1
	Philopotamidae	Chimarra *	
	Polycentropodidae	Neureclipsis	2
Decapoda	Cambaridae	Cambarus *	
Pelecypoda	Sphaeriidae	Pisidium *	

* Taxa not collected in 1990

NUMBER OF TAXA: 1986-90: 51
1990: 26

RBP SCORE: 46
DIVERSITY INDEX: 2.89

TABLE B6.--Water quality data for Snake Creek at Brookdale, Pa., 1986-90

Parameter	Units	07/23/90 1615
Discharge	cfs	14.45
Temperature	Celsius	19
Conductivity	umhos/cm	105
Dissolved Oxygen	mg/1	8.7
Biochemical Oxygen Demand	mg/1	0.4
pH		7.6
Alkalinity	mg/1	30
Acidity	mg/1	10
Solids - Dissolved	mg/1	62
- Total	mg/1	78
Ammonia as N - Dissolved	mg/1	0.02
Total	mg/1	0.02
Nitrite as N - Dissolved	mg/1	0.006
Total	mg/1	0.006
Nitrate as N - Dissolved	mg/1	0.24
Total	mg/1	0.24
Kjeldahl as N - Dissolved	mg/1	0.2
Total	mg/1	0.22
Phosphorus - Dissolved	mg/1	0.12
Total	mg/1	0.04
Orthophosphate as P - Dissolved	mg/1	0.002
Total	mg/1	0.006
Total Organic Carbon	mg/1	2.1
Magnesium - Total	mg/1	2.76
Chloride - Total	mg/1	8
Sulfate - Total	mg/1	10
Turbidity	NTU	2.1
Iron - Dissolved	ug/1	16
Total	ug/1	362
Manganese - Dissolved	ug/1	10
Total	ug/1	49
Alumimum - Dissolved	ug/1	135
Total	ug/1	146
WATER QUALITY INDEX		21

TABLE B7.--Macroinvertebrate data for Little Snake Creek at Brackney, Pa., 1988-90

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Optioservus	1
		Stenelmis	21
	Psephenidae	Psephenus	16
Diptera	Athericidae	Atherix *	
	Chironomidae		10
	Empididae	Hemerodromia *	
	Simuliidae	Simulium *	
	Tipulidae	Antocha *	
		Hexatoma	4
		Tipula *	
Ephemeroptera	Baetidae	Neocloeon *	
		Pseudocloeon *	
	Caenidae	Caenis	8
	Ephemerellidae	Ephemerella *	
		Eurylophella *	
	Ephemeridae	Ephemera *	
	Heptageniidae	Heptagenia *	
		Stenonema	4
	Leptophlebiidae	Paraleptophlebia	1
	Oligoneuriidae	Isonychia	1
Megaloptera	Corydalidae	Nigronia	3
	Sialidae	Sialis	2
Odonata	Gomphidae	Gomphus	7
		Hagenius *	
		Ophiogomphus	1
Plecoptera	Perlidae	Acroneuria	2
		Paragnetina *	
		Phasganophora *	
Trichoptera	Glossosomatidae	Glossosoma	8
	Hydropsychidae	Cheumatopsyche	3
		Hydropsyche *	
		Symphitopsyche	9
	Philopotamidae	Chimarra *	
Decapoda	Cambaridae	Cambarus *	

* Taxa not collected in 1990
NUMBER OF TAXA: 1988-90: 35
1990: 17

RBP SCORE: 28
DIVERSITY INDEX: 2.47

TABLE B8.--Water quality data for Little Snake Creek at Brackney, Pa., 1988-90

Parameter	Units	07/24/90 0850
Discharge	cfs	1.06
Temperature	Celsius	17
Conductivity	umhos/cm	135
Dissolved Oxygen	mg/l	8.7
Biochemical Oxygen Demand	mg/l	0.8
pH		7.4
Alkalinity	mg/l	46
Acidity	mg/l	10
Solids - Dissolved	mg/l	80
- Total	mg/l	92
Ammonia as N - Dissolved	mg/l	0.02
Total	mg/l	0.02
Nitrite as N - Dissolved	mg/l	0.004
Total	mg/l	0.004
Nitrate as N - Dissolved	mg/l	0.11
Total	mg/l	0.11
Kjeldahl as N - Dissolved	mg/l	0.2
Total	mg/l	0.2
Phosphorus - Dissolved	mg/l	0.03
Total	mg/l	0.05
Orthophosphate as P - Dissolved	mg/l	0.011
Total	mg/l	0.021
Total Organic Carbon	mg/l	5.2
Magnesium - Total	mg/l	3.17
Chloride - Total	mg/l	13
Sulfate - Total	mg/l	10
Turbidity	NTU	4.5
Iron - Dissolved	ug/l	648*
Total	ug/l	1,170
Manganese - Dissolved	ug/l	108
Total	ug/l	142
Alumimum - Dissolved	ug/l	135
Total	ug/l	171
WATER QUALITY INDEX		38

* Values exceed water quality standards.

TABLE B9.--Macroinvertebrate data for Choconut Creek at Vestal Center, N.Y., 1988-90

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Optioservus	2
		Stenelmis	3
	Gyrinidae	Dineutis	4
	Psephenidae	Psephenus	7
Diptera	Chironomidae		2
	Empididae	Hemerodromia *	
	Tipulidae	Antocha	3
		Hexatoma *	
		Tipula *	
Ephemeroptera	Baetidae	Baetis	1
		Pseudocloeon *	
	Caenidae	Caenis	5
	Ephemerellidae	Ephemerella *	
		Serratella	2
	Heptageniidae	Epeorus	3
		Heptagenia	2
		Stenonema	1
	Oligoneuriidae	Isonychia	26
Megaloptera	Corydalidae	Nigronia *	
Odonata	Gomphidae	Gomphus *	
		Ophiogomphus	2
Plecoptera	Leuctridae	Leuctra	1
	Perlidae	Acroneuria	2
		Phasganophora *	
	Perlodidae	Isoperla *	
Trichoptera	Glossosomatidae	Glossosoma	3
	Hydropsychidae	Cheumatopsyche *	
		Hydropsyche *	
		Symphitopsyche	21
	Philopotamidae	Chimarra	5
		Dolophilodes	2
	Polycentropodidae	Neureclipsis	2

* Taxa not collected in 1990
NUMBER OF TAXA: 1988-90: 32
1990: 21

RBP SCORE: 34
DIVERSITY INDEX: 2.53

TABLE B10.--Water quality data for Choconut Creek at Vestal Center, N.Y. 1988-90

Parameter	Units	07/24/90 1000
Discharge	cfs	8.08
Temperature	Celsius	16.5
Conductivity	umhos/cm	105
Dissolved Oxygen	mg/1	10
Biochemical Oxygen Demand	mg/1	0.4
pH		7.5
Alkalinity	mg/1	34
Acidity	mg/1	4
Solids - Dissolved	mg/1	76
- Total	mg/1	80
Ammonia as N - Dissolved	mg/1	0.02
Total	mg/1	0.02
Nitrite as N - Dissolved	mg/1	0.004
Total	mg/1	0.004
Nitrate as N - Dissolved	mg/1	0.28
Total	mg/1	0.28
Kjeldahl as N - Dissolved	mg/1	0.2
Total	mg/1	0.2
Phosphorus - Dissolved	mg/1	0.02
Total	mg/1	0.04
Orthophosphate as P - Dissolved	mg/1	0.002
Total	mg/1	0.005
Total Organic Carbon	mg/1	2.3
Magnesium - Total	mg/1	2.92
Chloride - Total	mg/1	7
Sulfate - Total	mg/1	12
Turbidity	NTU	1.28
Iron - Dissolved	ug/1	47
Total	ug/1	219
Manganese - Dissolved	ug/1	21
Total	ug/1	34
Alumimum - Dissolved	ug/1	135
Total	ug/1	135
WATER QUALITY INDEX		15

TABLE B11.--Macroinvertebrate data for Apalachin Creek at Little Meadows,Pa., 1988-90

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Ordobrevia *	
		Optioservus	2
		Stenelmis	3
	Hydrophilidae	Laccobius	2
	Psephenidae	Psephenus	15
Diptera	Chironomidae		5
	Simuliidae	Simulium *	
	Tipulidae	Hexatoma	2
		Tipula *	
Ephemeroptera	Baetidae	Baetis	5
		Centroptilum *	
	Caenidae	Caenis	1
	Ephemerellidae	Serratella	2
	Heptageniidae	Heptagenia *	
		Stenacron *	
		Stenonema	8
	Leptophlebiidae	Paraleptophlebia	1
	Oligoneuriidae	Isonychia	23
Megaloptera	Corydalidae	Corydalus	1
		Nigronia	2
	Sialidae	Sialis *	
Odonata	Gomphidae	Gomphus *	
		Ophiogomphus	4
Plecoptera	Leuctridae	Leuctra	1
	Perlidae	Acroneuria *	
	Perlodidae	Isoperla *	
Trichoptera	Glossosomatidae	Glossosoma *	
	Hydropsychidae	Cheumatopsyche	12
		Hydropsyche *	
		Symphitopsyche	9
	Philopotamidae	Chimarra	2
		Dolophilodes	1
Decapoda	Cambaridae	Cambarus *	
		Orconectes	1
Pelecypoda	Sphaeriidae	Musculium *	

* Taxa not collected in 1990

NUMBER OF TAXA: 1988-90: 36
1990: 21

RBP SCORE: 32
DIVERSITY INDEX: 2.59

TABLE B12.--Water quality data for Apalachin Creek at Little Meadows, Pa., 1988-90

Parameter	Units	07/24/90 1145
Discharge	cfs	4.55
Temperature	Celsius	17.5
Conductivity	umhos/cm	102
Dissolved Oxygen	mg/l	9.1
Biochemical Oxygen Demand	mg/l	0.4
pH		7.55
Alkalinity	mg/l	42
Acidity	mg/l	6
Solids - Dissolved	mg/l	90
- Total	mg/l	106
Ammonia as N - Dissolved	mg/l	0.02
Total	mg/l	0.02
Nitrite as N - Dissolved	mg/l	0.01
Total	mg/l	0.01
Nitrate as N - Dissolved	mg/l	0.5
Total	mg/l	0.43
Kjeldahl as N - Dissolved	mg/l	0.2
Total	mg/l	0.2
Phosphorus - Dissolved	mg/l	0.02
Total	mg/l	0.05
Orthophosphate as P - Dissolved	mg/l	0.002
Total	mg/l	0.017
Total Organic Carbon	mg/l	2.6
Magnesium - Total	mg/l	3.13
Chloride - Total	mg/l	5
Sulfate - Total	mg/l	10
Turbidity	NTU	2.4
Iron - Dissolved	ug/l	104
Total	ug/l	804
Manganese - Dissolved	ug/l	68
Total	ug/l	110
Alumimum - Dissolved	ug/l	135
Total	ug/l	498
WATER QUALITY INDEX		33

TABLE B13.--Macroinvertebrate data for Wappasening Creek at Nichols, N.Y., 1988-90

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Optioservus	2
		Stenelmis	7
	Gyrinidae	Dineutis *	
	Psephenidae	Ectopria	4
		Psephenus	20
Diptera	Athericidae	Atherix	1
	Chironomidae		12
	Empididae	Hemerodromia *	
	Tipulidae	Antocha *	
		Hexatoma *	
		Limonia *	
		Tipula *	
Ephemeroptera	Baetidae	Baetis	1
	Caenidae	Caenis	3
	Ephemerellidae	Ephemerella *	
	Ephemeridae	Ephemera	1
	Heptageniidae	Epeorus *	
		Heptagenia	3
		Stenacron *	
		Stenonema	16
	Leptophlebiidae	Leptophlebia	1
	Oligoneuriidae	Isonychia	4
	Tricorythidae	Tricorythodes	5
Megaloptera	Corydalidae	Corydalus *	
		Nigronia	2
	Sialidae	Sialis *	
Odonata	Coenagrionidae	Argia *	
	Gomphidae	Hagenius *	
		Ophiogomphus	2
		Stylogomphus	1
Plecoptera	Perlidae	Paragnetina *	
		Phasganophora	1
Trichoptera	Glossosomatidae	Glossosoma *	
	Hydropsychidae	Cheumatopsyche *	
		Hydropsyche *	
		Symphitopsyche	9
	Hydroptilidae	Stactobiella *	
	Philopotamidae	Chimarra *	
Decapoda	Cambaridae	Orconectes	1
Limnophila	Physidae	Physa	2

* Taxa not collected in 1990
NUMBER OF TAXA: 1988-90: 40
1990: 21

RBP SCORE: 32
DIVERSITY INDEX: 2.59

TABLE B14.--Water quality data for Wappasening Creek at Nichols, N.Y., 1988-90

Parameter	Units	07/24/90 1300
Discharge	cfs	27.95
Temperature	Celsius	19.5
Conductivity	umhos/cm	135
Dissolved Oxygen	mg/l	11.2
Biochemical Oxygen Demand	mg/l	0.4
pH		8.3
Alkalinity	mg/l	36
Acidity	mg/l	0
Solids - Dissolved	mg/l	92
- Total	mg/l	100
Ammonia as N - Dissolved	mg/l	0.02
Total	mg/l	0.02
Nitrite as N - Dissolved	mg/l	0.01
Total	mg/l	0.01
Nitrate as N - Dissolved	mg/l	0.32
Total	mg/l	0.32
Kjeldahl as N - Dissolved	mg/l	0.2
Total	mg/l	0.2
Phosphorus - Dissolved	mg/l	0.02
Total	mg/l	0.03
Orthophosphate as P - Dissolved	mg/l	0.005
Total	mg/l	0.009
Total Organic Carbon	mg/l	3.2
Magnesium - Total	mg/l	3.87
Chloride - Total	mg/l	9
Sulfate - Total	mg/l	14
Turbidity	NTU	1.7
Iron - Dissolved	ug/l	35
Total	ug/l	242
Manganese - Dissolved	ug/l	10
Total	ug/l	13
Alumimum - Dissolved	ug/l	135
Total	ug/l	162
WATER QUALITY INDEX		26

TABLE B15.--Macroinvertebrate data for North Fork Cowanesque River at North Fork, Pa., 1988-90

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Optioservus	4
		Stenelmis *	
	Gyrinidae	Dineutis	1
	Hydrophilidae	Laccobius *	
	Psephenidae	Psephenus	15
Diptera	Athericidae	Atherix *	
	Chironomidae		6
	Empididae	Hemerodromia *	
	Tabanidae	Chrysops *	
	Tipulidae	Hexatoma *	
		Tipula	2
Ephemeroptera	Baetidae	Baetis *	
		Neocloeon	8
		Pseudocloeon *	
	Caenidae	Caenis	2
	Ephemeridae	Ephemera *	
	Heptageniidae	Epeorus *	
		Heptagenia *	
		Ironodes	2
		Stenacron	2
		Stenonema	11
	Leptophlebiidae	Paraleptophlebia *	
	Oligoneuriidae	Isonychia	3
	Tricorythidae	Tricorythodes *	
Odonata	Gomphidae	Gomphus *	
		Ophiogomphus	1
Plecoptera	Leuctridae	Leuctra	16
	Perlidae	Paragnetina *	
		Phasganophora	7
	Pteronarcyidae	Pteronarcys	1
Trichoptera	Glossosomatidae	Glossosoma *	
	Hydropsychidae	Cheumatopsyche *	
		Hydropsyche	17
		Symphitopsyche	10
	Philopotamidae	Chimarra *	
Decapoda	Cambaridae	Cambarus *	

* Taxa not collected in 1990

NUMBER OF TAXA: 1988-90: 36
1990: 17

RBP SCORE: 32
DIVERSITY INDEX: 2.56

TABLE B16.--Water quality data for North Fork Cowanesque River at North Fork, Pa., 1988-90

Parameter	Units	07/26/90 1020
Discharge	cfs	0.62
Temperature	Celsius	16.5
Conductivity	umhos/cm	170
Dissolved Oxygen	mg/1	11
Biochemical Oxygen Demand	mg/1	0.4
pH		7.9
Alkalinity	mg/1	48
Acidity	mg/1	2
Solids - Dissolved	mg/1	90
- Total	mg/1	106
Ammonia as N - Dissolved	mg/1	0.02
Total	mg/1	0.02
Nitrite as N - Dissolved	mg/1	0.004
Total	mg/1	0.004
Nitrate as N - Dissolved	mg/1	1.76
Total	mg/1	1.76
Kjeldahl as N - Dissolved	mg/1	0.2
Total	mg/1	0.24
Phosphorus - Dissolved	mg/1	0.07
Total	mg/1	0.08
Orthophosphate as P - Dissolved	mg/1	0.046
Total	mg/1	0.06
Total Organic Carbon	mg/1	3.8
Magnesium - Total	mg/1	5.02
Chloride - Total	mg/1	10
Sulfate - Total	mg/1	18
Turbidity	NTU	7.8
Iron - Dissolved	ug/1	106
Total	ug/1	508
Manganese - Dissolved	ug/1	19
Total	ug/1	36
Alumimum - Dissolved	ug/1	135
Total	ug/1	243
WATER QUALITY INDEX		47

TABLE B17.--Macroinvertebrate data for Holden Creek at Woodhull, N.Y., 1988-90

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Optioservus *	
		Stenelmis *	
	Gyrinidae	Dineutis *	
	Psephenidae	Ectopria *	
		Psephenus	23
Diptera	Chironomidae	.....	12
	Empididae	Hemerodromia *	
	Tipulidae	Antocha *	
		Hexatoma *	
		Tipula	2
Ephemeroptera	Baetidae	Baetis	5
		Centroptilum *	
	Caenidae	Caenis	7
	Ephemeridae	Ephemera *	
	Heptageniidae	Epeorus *	
		Heptagenia *	
		Stenacron *	
		Stenonema	9
	Leptophlebiidae	Leptophlebia *	
		Paraleptophlebia	5
	Oligoneuriidae	Isonychia	2
	Tricorythidae	Tricorythodes *	
Megaloptera	Corydalidae	Nigronia	9
Odonata	Aeshnidae	Boyeria	4
	Coenagrionidae	Argia *	
	Gomphidae	Gomphus	7
		Ophiogomphus	5
Plecoptera	Leuctridae	Leuctra *	
	Perlidae	Acroneuria *	
		Phasganophora	2
Trichoptera	Hydropsychidae	Cheumatopsyche	2
		Hydropsyche *	
		Symphitopsyche	4
	Philopotamidae	Chimarra *	
	Polycentropodidae	Neureclipsis *	
Decapoda	Cambaridae	Cambarus	4
Pelecypoda	Sphaeriidae	Musculium *	

* Taxa not collected in 1990
NUMBER OF TAXA: 1988-90: 37
1990: 16

RBP SCORE: 28
DIVERSITY INDEX: 2.53

TABLE B18.--Water quality data for Holden Creek at Woodhull, N.Y., 1988-90

Parameter	Units	07/25/90 1515
Discharge	cfs	0.4
Temperature	Celsius	21
Conductivity	umhos/cm	260
Dissolved Oxygen	mg/1	8.7
Biochemical Oxygen Demand	mg/1	0.4
pH		7.75
Alkalinity	mg/1	110
Acidity	mg/1	8
Solids - Dissolved	mg/1	132
- Total	mg/1	134
Ammonia as N - Dissolved	mg/1	0.02
Total	mg/1	0.02
Nitrite as N - Dissolved	mg/1	0.004
Total	mg/1	0.004
Nitrate as N - Dissolved	mg/1	0.07
Total	mg/1	0.07
Kjeldahl as N - Dissolved	mg/1	0.2
Total	mg/1	0.22
Phosphorus - Dissolved	mg/1	0.04
Total	mg/1	0.04
Orthophosphate as P - Dissolved	mg/1	0.015
Total	mg/1	0.018
Total Organic Carbon	mg/1	4.3
Magnesium - Total	mg/1	7.39
Chloride - Total	mg/1	7
Sulfate - Total	mg/1	18
Turbidity	NTU	3.1
Iron - Dissolved	ug/1	10
Total	ug/1	176
Manganese - Dissolved	ug/1	10
Total	ug/1	12
Alumimum - Dissolved	ug/1	135
Total	ug/1	135
WATER QUALITY INDEX		30

TABLE B19.--Macroinvertebrate data for Seeley Creek at Seeley Creek, N.Y., 1986-90

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Optioservus *	
		Stenelmis	2
	Psephenidae	Psephenus	5
Diptera	Athericidae	Atherix *	
	Chironomidae		8
	Empididae	Hemerodromia *	
	Tipulidae	Antocha	1
		Hexatoma *	
		Limonia *	
		Tipula *	
Ephemeroptera	Baetidae	Baetis	4
		Centroptilum *	
		Cloeon *	
	Caenidae	Caenis	1
	Ephemerellidae	Drunella *	
		Ephemerella *	
		Eurylophella *	
		Serratella *	
	Ephemeridae	Ephemera *	
	Heptageniidae	Epeorus *	
		Heptagenia *	
		Stenacron *	
		Stenonema	4
	Leptophlebiidae	Leptophlebia *	
		Paraleptophlebia	1
	Oligoneuriidae	Isonychia	7
	Siphlonuridae	Siphlonurus	2
	Tricorythidae	Leptohyphes *	
		Tricorythodes	9
Megaloptera	Corydalidae	Nigronia	1
	Sialidae	Sialis *	
Odonata	Gomphidae	Erpetogomphus *	
		Ophiogomphus	1
		Stylogomphus *	
Plecoptera	Nemouridae	Amphinemura *	
	Perlidae	Acroneuria *	
		Phasganophora	1
	Perlodidae	Isoperla *	
Trichoptera	Brachycentridae	Brachycentrus *	
	Glossosomatidae	Glossosoma *	
	Hydropsychidae	Cheumatopsyche	10
		Hydropsyche	4
		Symphitopsyche	41

TABLE B19.--Macroinvertebrate data for Seeley Creek at Seeley Creek, N.Y., 1986-90

Order	Family	Genus	Individuals Collected
	Hydroptilidae	Leucotrichia *	
		Stactobiella *	
	Philopotamidae	Chimarra *	
	Polycentropodidae	Neureclipsis *	
Limnophila	Physidae	Physa *	
	Planorbidae	Gyraulus *	
Lumbriculida	Lumbriculidae	Rhynchelmis *.....	

* Taxa not collected in 1990

NUMBER OF TAXA: 1986-90: 49
1990: 17

RBP SCORE: 22
DIVERSITY INDEX: 2.19

TABLE B20.--Water quality data for Seeley Creek at Seeley Creek, N.Y., 1986-90

Parameter	Units	07/25/90 1330
Discharge	cfs	16.64
Temperature	Celsius	23
Conductivity	umhos/cm	220
Dissolved Oxygen	mg/1	10.5
Biochemical Oxygen Demand	mg/1	0.4
pH		8.4
Alkalinity	mg/1	83
Acidity	mg/1	0
Solids - Dissolved	mg/1	112
- Total	mg/1	118
Ammonia as N - Dissolved	mg/1	0.02
Total	mg/1	0.02
Nitrite as N - Dissolved	mg/1	0.004
Total	mg/1	0.004
Nitrate as N - Dissolved	mg/1	0.04
Total	mg/1	0.07
Kjeldahl as N - Dissolved	mg/1	0.2
Total	mg/1	0.2
Phosphorus - Dissolved	mg/1	0.02
Total	mg/1	0.03
Orthophosphate as P - Dissolved	mg/1	0.002
Total	mg/1	0.002
Total Organic Carbon	mg/1	3.4
Magnesium - Total	mg/1	4.87
Chloride - Total	mg/1	10
Sulfate - Total	mg/1	21
Turbidity	NTU	1
Iron - Dissolved	ug/1	90
Total	ug/1	30
Manganese - Dissolved	ug/1	10
Total	ug/1	10
Alumimum - Dissolved	ug/1	135
Total	ug/1	135
WATER QUALITY INDEX		19

TABLE B21.--Macroinvertebrate data for South Creek at Fassett, Pa., 1988-90

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Dubiraphia *	
		Optioservus *	
		Stenelmis	3
	Psephenidae	Psephenus	10
Diptera	Athericidae	Atherix	1
	Chironomidae		6
	Empididae	Hemerodromia *	
	Simuliidae	Simulium *	
	Tabanidae	Chrysops *	
	Tipulidae	Antocha *	
Ephemeroptera	Baetidae	Baetis	5
		Pseudocloeon	4
	Caenidae	Caenis *	
	Ephemeridae	Ephemera *	
	Heptageniidae	Epeorus	3
		Heptagenia *	
		Stenonema	7
	Leptophlebiidae	Leptophlebia *	
		Paraleptophlebia *	
	Oligoneuriidae	Isonychia	5
	Tricorythidae	Tricorythodes *	
Megaloptera	Corydalidae	Corydalus	1
		Chauliodes *	
	Sialidae	Sialis *	
Odonata	Gomphidae	Gomphus *	
		Ophiogomphus *	
Plecoptera	Perlidae	Acroneuria *	
		Neoperla *	
		Phasganophora	1
Trichoptera	Brachycentridae	Brachycentrus *	
	Hydropsychidae	Cheumatopsyche	16
		Hydropsyche	14
		Symphitopsyche	9
	Hydroptilidae	Stactobiella *	
	Philopotamidae	Chimarra	19
	Polycentropodidae	Neureclipsis *	
		Nyctiophylax *	
Hydracarina *			
Collembola *			
Decapoda	Cambaridae *		
Pelecypoda	Sphaeriidae *		
Tricladida	Planariidae	Dugesia *	

* Taxa not collected in 1990

NUMBER OF TAXA: 1988-90: 42
1990: 15

RBP SCORE: 30

DIVERSITY INDEX: 2.55

TABLE B22.--Water quality data for South Creek at Fassett, N.Y., 1988-90

Parameter	Units	07/25/90 1145
Discharge	cfs	6.41
Temperature	Celsius	20.5
Conductivity	umhos/cm	150
Dissolved Oxygen	mg/l	10.3
Biochemical Oxygen Demand	mg/l	0.4
pH		7.7
Alkalinity	mg/l	54
Acidity	mg/l	5
Solids - Dissolved	mg/l	76
- Total	mg/l	98
Ammonia as N - Dissolved	mg/l	0.02
Total	mg/l	0.02
Nitrite as N - Dissolved	mg/l	0.004
Total	mg/l	0.004
Nitrate as N - Dissolved	mg/l	0.24
Total	mg/l	0.26
Kjeldahl as N - Dissolved	mg/l	0.24
Total	mg/l	0.3
Phosphorus - Dissolved	mg/l	0.05
Total	mg/l	0.08
Orthophosphate as P - Dissolved	mg/l	0.022
Total	mg/l	0.036
Total Organic Carbon	mg/l	5.4
Magnesium - Total	mg/l	3.38
Chloride - Total	mg/l	5
Sulfate - Total	mg/l	19
Turbidity	NTU	18.7
Iron - Dissolved	ug/l	436*
Total	ug/l	1,680*
Manganese - Dissolved	ug/l	79
Total	ug/l	140
Alumimum - Dissolved	ug/l	135
Total	ug/l	639*
WATER QUALITY INDEX		46

* Values exceed water quality standards.

TABLE B23.--Macroinvertebrate data for Bentley Creek at Wellsburg, N.Y., 1986-90

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Optioservus *	
		Stenelmis *	
	Hydrophilidae	Tropisternus *	
	Psephenidae	Psephenus	21
Diptera	Chironomidae		19
	Empididae	Hemerodromia *	
	Simuliidae	Simulium *	
	Tipulidae	Hexatoma *	
		Tipula *	
Ephemeroptera	Baetidae	Baetis	5
		Pseudocloeon *	
	Caenidae	Caenis	2
	Heptageniidae	Epeorus *	
		Heptagenia	2
		Stenacron *	
		Stenonema	10
	Leptophlebiidae	Leptophlebia *	
		Paraleptophlebia	3
	Oligoneuriidae	Isonychia	3
	Tricorythidae	Tricorythodes	10
Megaloptera	Corydalidae	Nigronia *	
	Sialidae	Sialis *	
Odonata	Gomphidae	Gomphus *	
		Ophiogomphus	5
		Stylogomphus *	
Plecoptera	Capniidae	Paracapnia *	
	Leuctridae	Leuctra	3
	Perlidae	Acroneuria *	
		Paragnetina *	
		Phasganophora	5
Trichoptera	Glossosomatidae	Glossosoma *	
	Hydropsychidae	Cheumatopsyche	1
		Hydropsyche *	
		Symphitopsyche	10
	Hydroptilidae	Stactobiella *	
	Leptoceridae	Mystacides	1
	Philopotamidae	Chimarra *	
	Polycentropodidae	Neureclipsis	2
Decapoda	Cambaridae	Cambarus *	
Limnophila	Physidae	Physa	1
	Planorbidae	Gyraulus	2

* Taxa not collected in 1990

NUMBER OF TAXA: 1988-90: 41
1990: 18

RBP SCORE: 30
DIVERSITY INDEX: 2.45

TABLE B24.--Water quality data for Bentley Creek at Wellsburg, N.Y., 1986-90

Parameter	Units	07/25/90 1035
Discharge	cfs	15.11
Temperature	Celsius	18.5
Conductivity	umhos/cm	190
Dissolved Oxygen	mg/l	10.7
Biochemical Oxygen Demand	mg/l	0.4
pH		8
Alkalinity	mg/l	72
Acidity	mg/l	1
Solids - Dissolved	mg/l	80
- Total	mg/l	82
Ammonia as N - Dissolved	mg/l	0.02
Total	mg/l	0.02
Nitrite as N - Dissolved	mg/l	0.004
Total	mg/l	0.004
Nitrate as N - Dissolved	mg/l	0.15
Total	mg/l	0.15
Kjeldahl as N - Dissolved	mg/l	0.2
Total	mg/l	0.2
Phosphorus - Dissolved	mg/l	0.03
Total	mg/l	0.03
Orthophosphate as P - Dissolved	mg/l	0.002
Total	mg/l	0.002
Total Organic Carbon	mg/l	2.7
Magnesium - Total	mg/l	4.45
Chloride - Total	mg/l	8
Sulfate - Total	mg/l	20
Turbidity	NTU	1
Iron - Dissolved	ug/l	20
Total	ug/l	57
Manganese - Dissolved	ug/l	10
Total	ug/l	10
Alumimum - Dissolved	ug/l	135
Total	ug/l	135
WATER QUALITY INDEX		16

* Values exceed water quality standards.

TABLE B25.--Macroinvertebrate data for South Branch Conewago Creek at Bandanna, Pa., 1988-90

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Optioservus	11
		Stenelmis	1
Diptera	Chironomidae		1
	Dixidae	Dixa *	
	Tabanidae	Chrysops *	
	Tipulidae	Antocha *	
		Hexatoma	5
		Pedicia *	
		Tipula	4
Ephemeroptera	Baetidae	Baetis *	
		Centroptilum *	
	Ephemerellidae	Ephemerella *	
	Heptageniidae	Heptagenia *	
		Stenonema	1
	Leptophlebiidae	Paraleptophlebia *	
Megaloptera	Corydalidae	Nigronia	4
	Sialidae	Sialis	1
Odonata	Aeshnidae	Boyeria	2
	Coenagrionidae	Argia *	
	Gomphidae	Gomphus	3
		Stylogomphus *	
Plecoptera	Leuctridae	Leuctra	6
	Perlidae	Acroneuria	6
		Phasganophora	5
	Perlodidae	Isoperla	1
Trichoptera	Glossosomatidae	Glossosoma	1
	Hydropsychidae	Cheumatopsyche	3
		Hydropsyche	2
		Symphitopsyche	9
	Philopotamidae	Chimarra *	
		Dolophilodes *	
Hydracarina			1
Decapoda	Cambaridae	Procambarus	3

* Taxa not collected in 1990
NUMBER OF TAXA: 1988-90: 33
1990: 20

RBP SCORE: 46
DIVERSITY INDEX: 2.68

TABLE B26.--Water quality data for South Branch Conewago Creek at Bandanna, Pa., 1988-90

Parameter	Units	07/30/90 1150
Discharge	cfs	0.96
Temperature	Celsius	18
Conductivity	umhos/cm	100
Dissolved Oxygen	mg/l	9.6
Biochemical Oxygen Demand	mg/l	0.4
pH		7.7
Alkalinity	mg/l	36
Acidity	mg/l	4
Solids - Dissolved	mg/l	70
- Total	mg/l	74
Ammonia as N - Dissolved	mg/l	0.02
Total	mg/l	0.02
Nitrite as N - Dissolved	mg/l	0.004
Total	mg/l	0.004
Nitrate as N - Dissolved	mg/l	1.65
Total	mg/l	1.67
Kjeldahl as N - Dissolved	mg/l	0.2
Total	mg/l	0.2
Phosphorus - Dissolved	mg/l	0.02
Total	mg/l	0.03
Orthophosphate as P - Dissolved	mg/l	0.003
Total	mg/l	0.007
Total Organic Carbon	mg/l	1.3
Magnesium - Total	mg/l	2.82
Chloride - Total	mg/l	6
Sulfate - Total	mg/l	15
Turbidity	NTU	4.7
Iron - Dissolved	ug/l	10
Total	ug/l	324
Manganese - Dissolved	ug/l	10
Total	ug/l	22
Alumimum - Dissolved	ug/l	135
Total	ug/l	139
WATER QUALITY INDEX		13

TABLE B27.--Macroinvertebrate data for Long Arm Creek at Bandanna, Pa., 1988-90

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Macronychus	1
		Optiosevus	6
		Stenelmis	2
	Psephenidae	Psephenus	2
Diptera	Athericidae	Atherix	2
	Chironomidae		8
	Simuliidae	Simulium *	
	Tipulidae	Antocha	6
		Hexatoma	2
		Tipula	1
Ephemeroptera	Baetidae	Baetis	18
		Heterocloeon *	
	Caenidae	Caenis *	
	Ephemerellidae	Serratella *	
	Ephemeridae	Ephemera *	
	Heptageniidae	Epeorus	1
		Heptagenia *	
		Stenacron *	
		Stenonema	3
	Leptophlebiidae	Paraleptophlebia	1
	Oligoneuriidae	Isonychia	1
Megaloptera	Corydalidae	Nigronia *	
	Sialidae	Sialis *	
Plecoptera	Leuctridae	Leuctra	1
	Perlidae	Phasganophora *	
Trichoptera	Glossosomatidae	Glossosoma	17
	Hydropsychidae	Cheumatopsyche	3
		Hydropsyche	2
		Symphitopsyche	27
Decapoda	Cambaridae	Cambarus *	
		Orconectes *	

* Taxa not collected in 1990
NUMBER OF TAXA: 1988-90: 31
1990: 19

RBP SCORE: 42
DIVERSITY INDEX: 2.31

TABLE B28.--Water quality data for Long Arm Creek at Bandanna, Pa., 1988-90

Parameter	Units	07/30/90 1045
Discharge	cfs	1.27
Temperature	Celsius	17
Conductivity	umhos/cm	185
Dissolved Oxygen	mg/1	9.7
Biochemical Oxygen Demand	mg/1	1.2
pH		7.35
Alkalinity	mg/1	34
Acidity	mg/1	6
Solids - Dissolved	mg/1	126
- Total	mg/1	142
Ammonia as N - Dissolved	mg/1	0.02
Total	mg/1	0.02
Nitrite as N - Dissolved	mg/1	0.01
Total	mg/1	0.01
Nitrate as N - Dissolved	mg/1	6.52
Total	mg/1	6.52
Kjeldahl as N - Dissolved	mg/1	0.41
Total	mg/1	0.41
Phosphorus - Dissolved	mg/1	0.03
Total	mg/1	0.04
Orthophosphate as P - Dissolved	mg/1	0.004
Total	mg/1	0.008
Total Organic Carbon	mg/1	2.2
Magnesium - Total	mg/1	5.16
Chloride - Total	mg/1	14
Sulfate - Total	mg/1	31
Turbidity	NTU	10.6
Iron - Dissolved	ug/1	40
Total	ug/1	788
Manganese - Dissolved	ug/1	28
Total	ug/1	51
Alumimum - Dissolved	ug/1	135
Total	ug/1	561*
WATER QUALITY INDEX		39

* Values exceed water quality standards.

TABLE B29.--Macroinvertebrate data for Big Branch Deer Creek at Fawn Grove, Pa., 1988-90

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Optioservus	3
		Stenelmis	1
	Psephenidae	Ectopria *	
		Psephenus *	
	Ptilodactylidae	Anchytarsus *	
Diptera	Chironomidae		8
	Empididae	Hemerodromia *	
	Simuliidae	Simulium *	
	Tipulidae	Antocha *	
		Tipula *	
Ephemeroptera	Baetidae	Cloeon	1
		Heterocloeon *	
		Pseudocloeon *	
	Ephemerellidae	Serratella	1
	Heptageniidae	Epeorus	8
		Heptagenia *	
		Stenonema	6
	Oligoneuriidae	Isonychia	1
Megaloptera	Corydalidae	Chauliodes *	
		Nigronia	8
	Sialidae	Sialis *	
Odonata	Calopterygidae	Hetaerina *	
	Gomphidae	Gomphus	2
		Hagenius *	
Plecoptera	Leuctridae	Leuctra	17
	Perlodidae	Isoperla *	
Trichoptera	Glossosomatidae	Glossosoma *	
	Hydropsychidae	Cheumatopsyche *	
		Hydropsyche	5
		Symphitopsyche	30
	Philopotamidae	Chimarra *	
		Dolophilodes	4
	Rhyacophilidae	Rhyacophila	2
Decapoda	Cambaridae	Cambarus *	
Tricladida	Planariidae	Dugesia *	

* Taxa not collected in 1990

NUMBER OF TAXA: 1988-90: 35
1990: 15

RBP SCORE: 32
DIVERSITY INDEX: 2.22

TABLE B30.--Water quality data for Big Branch Deer Creek at Fawn Grove, Pa., 1988-90

Parameter	Units	07/31/90 1115
Discharge	cfs	2.03
Temperature	Celsius	17
Conductivity	umhos/cm	120
Dissolved Oxygen	mg/1	10.3
Biochemical Oxygen Demand	mg/1	0.4
pH		7.4
Alkalinity	mg/1	24
Acidity	mg/1	4
Solids - Dissolved	mg/1	102
- Total	mg/1	106
Ammonia as N - Dissolved	mg/1	0.02
Total	mg/1	0.02
Nitrite as N - Dissolved	mg/1	0.004
Total	mg/1	0.004
Nitrate as N - Dissolved	mg/1	4.84
Total	mg/1	4.84
Kjeldahl as N - Dissolved	mg/1	0.2
Total	mg/1	0.2
Phosphorus - Dissolved	mg/1	0.02
Total	mg/1	0.02
Orthophosphate as P - Dissolved	mg/1	0.003
Total	mg/1	0.005
Total Organic Carbon	mg/1	1.1
Magnesium - Total	mg/1	4.7
Chloride - Total	mg/1	10
Sulfate - Total	mg/1	10
Turbidity	NTU	1.83
Iron - Dissolved	ug/1	23
Total	ug/1	92
Manganese - Dissolved	ug/1	10
Total	ug/1	10
Alumimum - Dissolved	ug/1	150
Total	ug/1	150
WATER QUALITY INDEX		12

< Actual value is less than reported value.

* Values exceed water quality standards.

TABLE B31.--Macroinvertebrate data for Falling Branch Deer Creek at Fawn Grove, Pa., 1988-90

Order	Family	Genus	Individuals Collected
Coleoptera	Elmidae	Optioservus *	
		Stenelmis	6
Diptera	Chironomidae		9
	Empididae	Hemerodromia *	
	Simuliidae	Simulium *	
	Tipulidae	Antocha	2
		Tipula	2
Ephemeroptera	Baetidae	Baetis	3
		Centroptilum *	
		Heterocloeon *	
		Pseudocloeon *	
	Ephemerellidae	Serratella	1
	Heptageniidae	Epeorus *	
		Stenonema	4
	Leptophlebiidae	Paraleptophlebia *	
	Oligoneuriidae	Isonychia	2
Megaloptera	Corydalidae	Chauliodes *	
		Nigronia	7
Odonata	Aeshnidae	Boyeria	1
	Gomphidae	Gomphus	1
Plecoptera	Leuctridae	Leuctra	6
Trichoptera	Glossosomatidae	Glossosoma *	
	Hydropsychidae	Cheumatopsyche	9
		Hydropsyche	10
		Symphitopsyche	36
	Philopotamidae	Chimarra	3
	Rhyacophilidae	Rhyacophila	1
Haplotaxida	Naididae *		

* Taxa not collected in 1990

NUMBER OF TAXA: 1988-90: 28
1990: 17

RBP SCORE: 28

DIVERSITY INDEX: 2.27

TABLE B32.--Water quality data for Falling Branch Deer Creek at Fawn Grove, Pa., 1988-90

Parameter	Units	07/31/90 1215
Discharge	cfs	1.71
Temperature	Celsius	20
Conductivity	umhos/cm	130
Dissolved Oxygen	mg/1	10.7
Biochemical Oxygen Demand	mg/1	0.4
pH		7.3
Alkalinity	mg/1	24
Acidity	mg/1	6
Solids - Dissolved	mg/1	88
- Total	mg/1	94
Ammonia as N - Dissolved	mg/1	0.05
Total	mg/1	0.02
Nitrite as N - Dissolved	mg/1	0.008
Total	mg/1	0.008
Nitrate as N - Dissolved	mg/1	4.83
Total	mg/1	4.83
Kjeldahl as N - Dissolved	mg/1	0.36
Total	mg/1	0.41
Phosphorus - Dissolved	mg/1	0.03
Total	mg/1	0.03
Orthophosphate as P - Dissolved	mg/1	0.005
Total	mg/1	0.008
Total Organic Carbon	mg/1	1.8
Magnesium - Total	mg/1	4.3
Chloride - Total	mg/1	12
Sulfate - Total	mg/1	10
Turbidity	NTU	5.1
Iron - Dissolved	ug/1	66
Total	ug/1	297
Manganese - Dissolved	ug/1	23
Total	ug/1	28
Alumimum - Dissolved	ug/1	150
Total	ug/1	182
WATER QUALITY INDEX		24

SUSQUEHANNA RIVER BASIN COMMISSION
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